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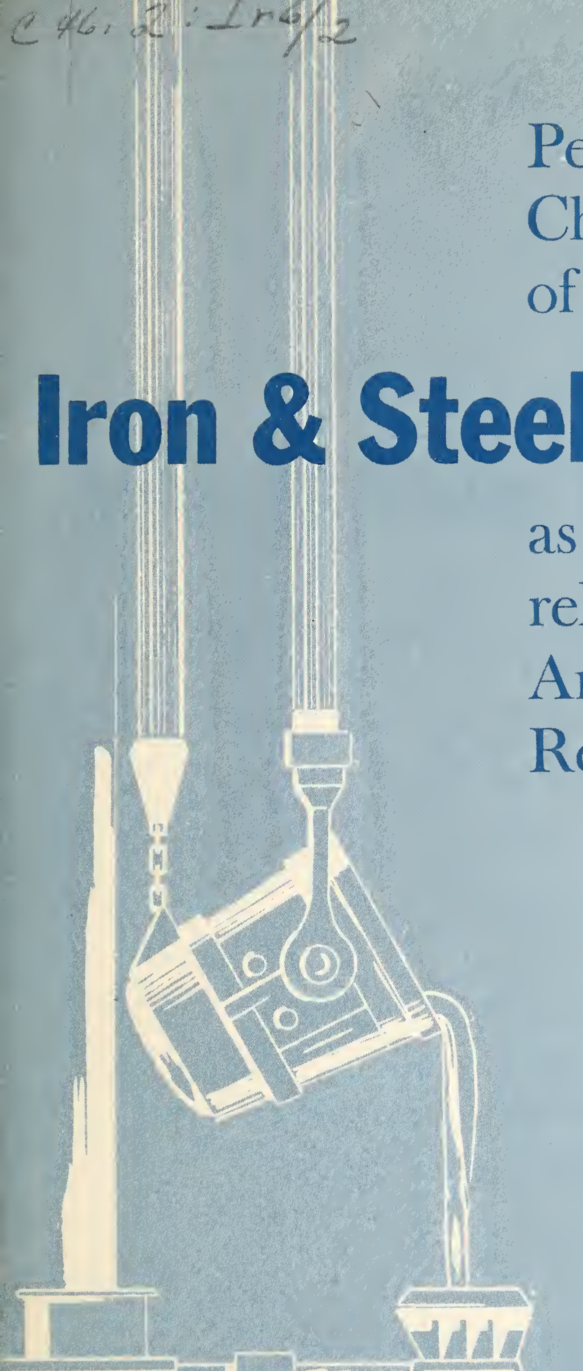
Pertinent Characteristics of the Iron & Steel Industry as related to Area Redevelopment



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Pertinent Characteristics of the **Iron & Steel Industry** as related to Area Redevelopment

U.S. DEPARTMENT OF COMMERCE
Luther H. Hodges, *Secretary*
AREA REDEVELOPMENT ADMINISTRATION
William L. Batt, Jr., *Administrator*

NOVEMBER 1964

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FOREWORD

This study represents an initial effort at determining specific characteristics for a specific industry under consideration by the Area Redevelopment program. The study was prepared by Senior Economist John A. Flory of the Office of Program Development, Area Redevelopment Administration, as a guide for project evaluation by ARA staff personnel. It is also useful to those engaged in the iron and steel industry as well as industrial development groups which seek to improve the economies of their areas through this industry.

This study was completed in early 1964 and mainly reflects those trends which were apparent prior to that time.

William L. Batt, Jr.,
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MAIN POINTS OF THE STUDY

- The iron and steel industry is basic and complex and is dominated (but not necessarily controlled) by eight major, highly integrated companies.
- Steel product markets have shifted in relative importance since the beginning of this century, becoming more static in recent decades. Steel exports have varied widely in relative importance and are currently at a low point.
- Steel ingot production has increased nearly 10-fold since the turn of the century. Production in the 1958–62 period ran 10 to 15 percent below the post World War II peak (1955). A moderate recovery was scored more recently. The prospect for future growth is problematical. Assuming the emergence of no great new problems or markets, the industry's production level should rise moderately in coming years and reach new peaks before 1970.
- Imports of steel continue to cloud the overall outlook of the domestic steel industry. Recently, imports have constituted 5 to 6 percent of total U.S. supply, up from only 1.5 percent in 1957. No deterioration in this trend is indicated as yet.
- The steel industry operating rate (production as a percent of capacity) has declined from its early postwar (1947–57) average of nearly 90 percent, to between 60 and 70 percent (71 percent in 1963). The industry's traditional operating rate is 80 percent. It is doubtful that the industry ever will operate at much above 80 percent of capacity for an extended peacetime period. On the other hand, operating rates below 80 percent generally produce depressed profits and are likely to prevail only as cyclical lows. Examination of operating rates on a state and multi-state basis indicated no regional shortages in steel supply.
- At least 90 percent of the steel industry's estimated production facilities represent valid, profitable capacity based on present conditions.
- Profits in the steel industry are currently depressed relative to both all-manufacturing profits and the steel industry's own historical average.
- Several recent advances have been made in steel-making processes, but none of those currently being used in the U.S. industry have the potential for causing large-scale abandonment of existing facilities. The evaluation of new processes that have not yet passed the laboratory testing stage is beyond the scope of this report.
- The steel industry's labor intensity approximates the all-manufacturing norm. Investment per employee is large, but the industry's employees receive higher than average wages. Wage rates are vir-

tually uniform, company to company, in the steel industry, and unionization is almost complete. Unemployment is relatively severe among persons having work experience in steel-making. A sizable portion of the steel industry is located in redevelopment areas, and these areas are experiencing a shrinking proportion of the industry's output.

- Growth rates in various product groups have varied over the past decade, but none have been spectacular. Increases in certain categories of imports have, however. While total steel product imports are equal to only 5 to 6 percent of total domestic supply, the inroads made into individual product categories by foreign producers range from a negligible percentage up to about one-half.
- Because the steel industry has not sufficiently recovered from its beleagured state of the past several years, it is suggested that ARA follow a restrictive policy on iron and steel projects, except in selected instances where there is a proven probability that the project can obtain its market from import displacement. (See Implications for ARA Policy on Iron and Steel Projects in this report.)

BASIC IRON AND STEEL INDUSTRY—GENERAL

The steel industry is comprised of firms whose activities, individually or collectively, involve the operation of iron ore, coal, and limestone mines; large transportation facilities (ships and railroads); coke ovens; iron- and steel-making furnaces; and rolling mills for breaking down and finishing steel ingots into a diverse list of steel products and, in some cases, further fabrication into end products. Companies performing all of the above functions (as do the eight major companies) are termed fully integrated.

The coverage of this report is restricted to the manufacturing phases of iron and steel production from the raw material assembly point through the initial processing of steel ingots to the completion of certain steel products.

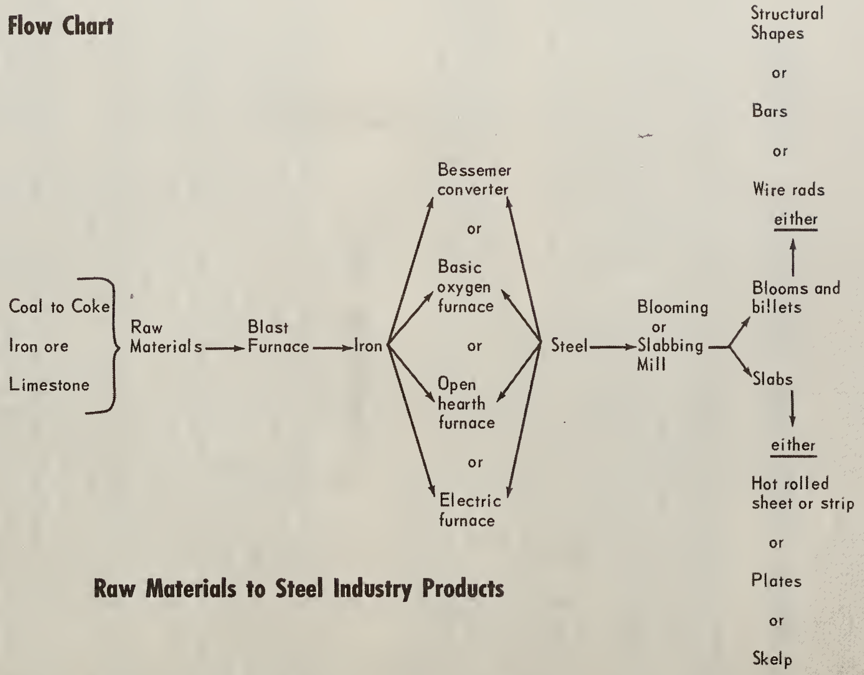
Production Flow

The flow chart on page 4 outlines the main manufacturing phases. The basic raw materials for iron and steel production are iron ore, coal converted into coke, and limestone. The ore (often after being upgraded through beneficiation processes) is placed in a blast furnace with limestone as a flux material and coke. The coke supplies the heat and carbon needed to separate the metallic iron from the undesired elements. The resultant iron, if it is not processed into iron products, is further refined together with portions of steel scrap in a steel-making furnace to reduce the carbon content of the metal.

The open hearth is the principal type of steel-making furnace in use today. The average metallic charge in this furnace is about 60 percent molten iron and 40 percent scrap steel. Electric furnaces, which essentially are a modification of the open hearth using electric current for heat rather than oil or gas, are second in importance on a tonnage basis. More exact control of the steel-making process is possible in electric furnaces; for this reason, stainless and other high-alloy steels are made almost exclusively in electric furnaces. Scrap steel is the major metallic charge in this type furnace, and very little and in many cases no molten (or pig) iron is used.

Oxygen converters have been growing in importance in recent years and eventually may be a major method of making steel. The oxygen converters are similar to the Bessemer furnaces, a major difference being the use of oxygen instead of air to purify the molten metal. In both oxygen and Bessemer converters, the charge usually consists 75 percent or higher of molten iron. Bessemers were the principal steel-making furnaces in the nineteenth century but have declined sharply in importance since development and improvement of open hearths. Open hearths now account for 85 percent of total U.S. steel

Flow Chart



Raw Materials to Steel Industry Products production, electric furnaces 9 percent, basic oxygen furnaces 5 percent, and Bessemer converters 1 percent. (In Europe, the Bessemer process is still the most important, but new installations are principally oxygen converters.)

The main product of the steel mill is the steel ingot.[1] The ingot is heated and processed through either a blooming or slabbing mill. The blooms (or billets) or slabs are further milled into basic steel products: Wire rods, bars, or structural shapes in the case of blooms; and hot rolled sheet or strip, plates, or skelp in the case of slabs. These products are sold to steel users or, in some cases, are further processed toward the end-product stage by the steel manufacturer.

Three Major Types of Steel

Carbon Steels. About 93 percent of finished steel shipments consist of the so-called carbon or tonnage grade steels. To define carbon steel precisely is not possible except to state that these grades contain very little alloying elements, while the carbon content ranges from 0.08 up to 1.7 percent. Low-carbon steels (0.08 to 0.35 percent C) are used largely for flat-rolled products because these grades are readily formed and easily welded; increases in the carbon content result in greater hardness, tensile strength, and yield strength. In tonnage, all major finished steel shapes are primarily carbon steels; tinplate, galvanized sheets, and wire products are almost exclusively carbon products. The carbon grades can be made in any type steel furnace (open hearth, electric, basic oxygen or Bessemer).

Alloy Steels. Alloy steels, accounting for 6 percent of industry volume, are grades that have substantially improved physical properties (e.g., corrosion resistance, strength, wear resistance, special electrical attributes) resulting from the addition of varying quantities of alloying elements.

Stainless Steels. Stainless steels account for less than 1 percent of steel shipments but represent a much higher portion of dollar sales because of their high prices.

Stainless steel is made exclusively in electric furnaces, which are best suited for the exacting specifications of this product and for the relatively small tonnages produced in each heat. Scrap steel accounts for almost all of the ferrous charge used in making stainless steel.

The relatively small capital outlays needed for electric furnace facilities, the small and specialized nature of production, and the comparable marketing outlets make this part of the steel industry well suited for small, specialty steel producers.

Materials

The production of one ton of finished steel product typically requires 3½ tons of raw materials, including iron ore, coal, limestone, and scrap. Raw materials account for up to half of the cost of steel mill products. These costs vary with the efficiency of mining operations, the distance and means of transporting the raw materials to the steel mill, and the portion of materials obtained from captive mines rather than from outside suppliers. Large companies which are also substantially integrated in coal and limestone generally receive at least three-quarters of their ore requirements from owned affiliated mines.

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[1] Crude steel tapped from the furnace is poured into cast-iron molds where it solidifies into a steel ingot. The ingot is then ready to be made into commercial shapes for fabrication into end products. The bulk of the primary steel industry's output is worked through hot rolling. A small portion is forged (hammered and pressed). An even smaller amount is sold as ingot or cast into finished products at the mill. The description in the text refers mainly to hot rolling.

Iron Ore. The Lake Superior district (Minnesota, Michigan, and Wisconsin) now supplies slightly over half of the U.S. industry's ore requirements. The decline from three-quarters a decade ago reflects the gradual depletion of the better reserves and the discovery of higher-grade foreign ore. Other domestic mines furnish about 15 percent of the industry's ore needs, about the same as a decade earlier, and foreign ores (largely from Canada and Venezuela) supply some 30 percent, up from 9 percent in 1952.

Standard Lake Superior ore contains 51½ percent iron; a premium is paid for higher-grade material and a discount for ore with lower iron content. Most ore from this area was formerly shipped as mined or with a minimum amount of processing (mainly screening or washing). Since economies in present day blast-furnace operation demand more "tailor-made" ore, the bulk of the ore is now beneficiated or upgraded before being used.

Low-grade ores (taconite) averaging about 25 to 30 percent iron content are also used now but are concentrated (in both the United States and Canada) to 60–64 percent iron and then formed into pellets, which give substantial economies in blast-furnace operation. These pellets (made mainly from Minnesota taconite and Michigan jasper) and other agglomerated products account for almost 30 percent of ore shipments from the Lake Superior region. In addition to processing at the mine, some 35 percent of the industry's ore is sintered (a process that effects the fusing of fine ores). Currently, close to 60 percent of blast-furnace feed consists of pellets, sinter, and other agglomerated ores, compared with only 27 percent in 1957. The outlook for the future favors a further rise in usage of agglomerates and a drop in utilization of direct shipping and lightly beneficiated ores.

Coal. On the average, roughly two-thirds of a ton of coking coal is needed to make a ton of steel. The coal (metallurgical grades) is made into coke, which supplies the heat needed in the blast furnace to melt the iron in the ore and acts as a reducing agent. Improvements in blast-furnace operation, upgrading of ore, and improved coke quality have enabled the industry to sharply reduce coke usage per ton of iron production.

Merchant Pig Iron. Pig iron not used by the producing company is called merchant pig. In recent years, about 7 to 10 percent of total blast-furnace output has gone into the merchant market, principally to automobile companies, foundries, cast-iron pipe plants, and to semi- or nonintegrated steel companies. In addition to varying with activity in the consuming industries, demand for merchant iron also fluctuates inversely with changes in prices of scrap iron and steel, since consumers can vary their mixture of virgin iron and scrap to obtain the maximum cost advantages. Merchant pig iron is a product of the blast furnace and (some of it) a raw material for steel-making furnaces.

Scraps. Some 40 percent of the metallics charged in open hearths and virtually all of the electric-furnace charge consist of scrap steel.

Hence, scrap is still a very important raw material. Industrywide, some 60 to 65 percent of the scrap used is home scrap, that is, material lost in processing such as sheared and cropped ends, mill scale, and fabrication waste. About half of purchased scrap comes from industrial consumers of steel and is derived from trimmed stampings, machine turnings, rejected products, used steel strapping, etc. The remainder is purchased chiefly from dealers and jobbers and consists of what is usually thought of as "junk"—old automobiles, broken machinery, farm scrap, outmoded consumer goods, railroad scrap, old ships, and parts of wrecked buildings.

Limestone and Other Materials. Limestone, a fluxing agent used in the blast furnace, is in plentiful supply. The largest quarry in the world is located in Michigan. Fluorspar, the fluxing agent in open hearths, is in limited supply but could be replaced by less desirable materials.

Other important raw materials, all of which are susceptible to severe shortage during wartime or other periods of very high steel production, are chromium, a refractory and alloying element; nickel, also an alloying metal; and manganese, a scavenger and also an additive used to toughen steel. Tungsten, cobalt and tin are other imported materials.

Transportation Costs

Freight charges are a vital factor in the cost of raw materials and as a determinant of selling prices. Thus, the best located steel plants are those that have ready access to raw materials and low-cost water transportation, and that are close to large steel-consuming areas.

The cost of assembling the materials (iron ore, coal, and limestone) necessary to produce a ton of pig iron varies greatly between the major producing centers. For example, Pittsburgh has lower coal costs than Chicago because of the latter's long rail haul from the coal fields. However, Chicago has somewhat lower ore-assembly costs and appreciably lower scrap costs because customers' scrap generation in this steel-deficient area exceeds the requirements of district mills.

As for freight costs on finished products, mills in Detroit, Chicago, Cleveland, and on the West Coast sell most of their output relatively close to the mills and do not have to absorb as much freight charges as Pittsburgh and Youngstown area mills. A major West Coast producer (Kaiser) has extremely low transportation costs on ore from its California mine, which much more than offset those for the long rail haul of coal.

Concentration of the Industry

Because of the huge capital investment required, the industry is dominated (but not necessarily controlled) by eight major companies, which account for approximately three-fourths of production. Some 72 percent of all manufacturing industries are less concentrated than is the steel industry.

By product group, the eight largest companies in each group accounted for the following percentages of each group's shipments in 1958:

	Percent
Coke-oven and blast-furnace products, including blast-furnace ferroalloys	69
Steel ingot and semifinished shapes	85
Hot-rolled sheet and strip, including tin-mill products	78
Hot-rolled bars and bar shapes, plates, structural shapes, and piling	76
Steel wire made in blast furnaces and steel mills	72
Steel pipe and tube made in blast furnaces and steel mills	85
Cold-rolled steel sheet and strip made in blast furnaces and steel mills	72
Cold-finished steel bars and bar shapes made in blast furnaces and steel mills	80
Open die or smith forgings (open frame hammer or press) produced in steel mills	98
Other steel-mill products, except wire products	83
Electrometallurgical products, excluding blast-furnace ferroalloys	86
Noninsulated ferrous wire rope, cable and strand made in industries 3312* and 3315	92
Steel nails and spikes	59
Steel wire (not made in industry 3312)	60
Fencing and fence gates made in industries 3312 and 3315	88
Wire cloth and other woven wire products made in industries 3312 and 3315	92
Other fabricated ferrous wire products made in industries 3312 and 3315	79
Cold finishing of steel shapes	60
Cold-rolled steel sheet and strip not made in industry 3312	70
Cold-finished steel bars and bar shapes not made in industry 3312	81
Steel pipe and tubes not made in industry 3312	54
Gray-iron castings	31
Molds for heavy steel ingots	94
Cast-iron pressure pipe	87
Cast-iron soil pipe and fittings	60
All other gray-iron castings	36
Malleable iron castings	51
Steel castings	31

*These are Standard Industrial Classification (SIC) numbers as defined by the Bureau of the Budget.

The eight major companies' share of the total steel market has been fairly constant in recent years, although substantial changes have occured within this group. U.S. Steel's portion of steel output dropped from 65 percent early in the century to about 40 percent during the late 1920's, to 32 percent in the first half of the 1950's, and to 26 percent during 1961 and 1962.

MARKETS AND GROWTH FACTORS

Market Breakdown

Industrial plant and equipment outlays represent the major steel-consuming sector of the economy. This sector has consumed a relatively consistent portion of steel production since the turn of the century, generally fluctuating around 40 percent, hitting low points during periods of business downturn and high points during periods of war or prosperity. Over the years, investment in plant construction has declined while that for equipment has risen.

Steel use in consumer durables production has shown the greatest relative increase over the past 60 years, averaging 22 percent of the total recently, up from 3–4 percent in the early 1900's. However, this sector has not shown any appreciable change since 1930, with the exception of the sharp World War II contraction. The automotive market accounts for the bulk of steel usage in this category, taking an average of about two tons per vehicle prior to scrap losses in fabrication.

Freight transportation, mainly railroads, has shown the most steady relative decline in steel consumption, dropping from about 40 percent in 1901–05 to about 10 percent in 1956–60.

The energy segment of the steel market advanced from 1900 to 1930, receded during the depression and war years, and recovered more recently to 9–10 percent of the total demand.

Steel usage in containers has shown a fairly consistent relative increase since 1900, although a peak was reached during the thirties when certain other categories contracted. Recent consumption in the manufacture of containers approaches 10 percent of steel usage.

Steel exports have varied widely in relative importance. Peaks have been reached during war and early postwar periods. The percentage for the 1955–60 period was four to five percent, about the same as for 1900–05 and similar intervening periods.

Growth Trends

More important than relative expansion or contraction of steel markets are the actual growth trends in the whole steel industry. Steel ingot production has increased nearly ten-fold since the turn of the century. Total production was 11.2 million tons in 1900, 28.3 million in 1910, 46.2 million in 1920 (after a World War I peak of 49.8 million in 1917), 44.6 million in 1930 (then dropping to a depression low of 15.1 million in 1932), 67.0 million in 1940, 96.8 million in 1950 (exceeding the 89.6 million World War II high in

1944), and 99.3 million in 1960 (off from the all-time high of 117.0 million in 1955).

Steel-ingot consumption per capita has risen from about 400 pounds per person in the 1900–05 period to over 1,100 in 1955–60. The trend line for per-capita consumption has shown fairly consistent gains, except that sharper increases were scored during war years and a sizable drop was incurred in the 1930's.

Chart A shows steel-tonnage trends since 1940, along with trends for dollar shipments and employment. Tonnage shipments grew moderately from 1940 through 1955, tapered back to early post World War II levels by 1961, then recovered slightly in 1962–63. The trend in employment was even more gradually upward and reached its peak earlier (in 1953). Dollar shipments, strongly augmented by price increases, advanced sharply until 1957 when prices stabilized. The contraction in dollar value since 1957 has about mirrored that for tonnage.

Almost two-thirds of the drop in steel production from the 1955–57 peak was attributable to reduced steel demand in the United States stemming from the slowdown in the durable goods sector of the economy, sharply lowered steel usage by the railroad and oil industries, substitution of other materials for steel, greater economy in steel usage (that is, less metal per unit as in compact cars and cans) and, to some extent, to a long-term reduction in user's steel inventories. The other third of the drop reflects the change in the Nation's foreign-trade position from a net exporter of steel to a net importer. The partial recovery staged in 1963 reflected sharp cyclical gains in consumer durables (mainly automobiles) and capital-goods spending.

Imports—Exports

Imports of steel products, fairly negligible prior to and during World War II, multiplied in quantity several times during the postwar period. This volume is currently approaching 6 million tons. about 5 times that imported in 1950 and over 10 times the early postwar level. The most dynamic increase took place in 1959—4.4 million tons, up from 1.7 million in 1958 and 1.2 million in 1957 (see Chart B). On a percentage basis, imported steel has constituted recently about five to six percent of total United States steel consumption.

Exports of steel products have had some significance since the early part of the twentieth century, reaching peaks in volume (six to eight million tons) during war years and low points (one to three million tons) during "normal" periods. Postwar export tonnages have fluctuated from nearly 6 million (5.9 million in 1947, 5.3 million in 1957) down to around 2 million (2.6 million in 1950, 1.7 million in 1959, 2.0 million in 1961 and 1962) (see Chart B). The long established position of the United States as a net exporter of steel-mill products ceased in 1959. Initially, this occurred during the disruptive influences of the lengthy steel industry strike in the United States, but continuance of the unfavorable trade balance reflects the buildup in steel-making capacity of foreign mills. The fact that imports of steel products have exceeded exports since 1959 reflects the fairly rapid increase in imports in recent years rather than a decline in exports, which have always been somewhat erratic. The future course of the Nation's foreign-trade position in steel is not clear.

Chart A

Trends in Value of Shipments, Tonnage Shipped and Employment in the Steel Industry, 1940-1962

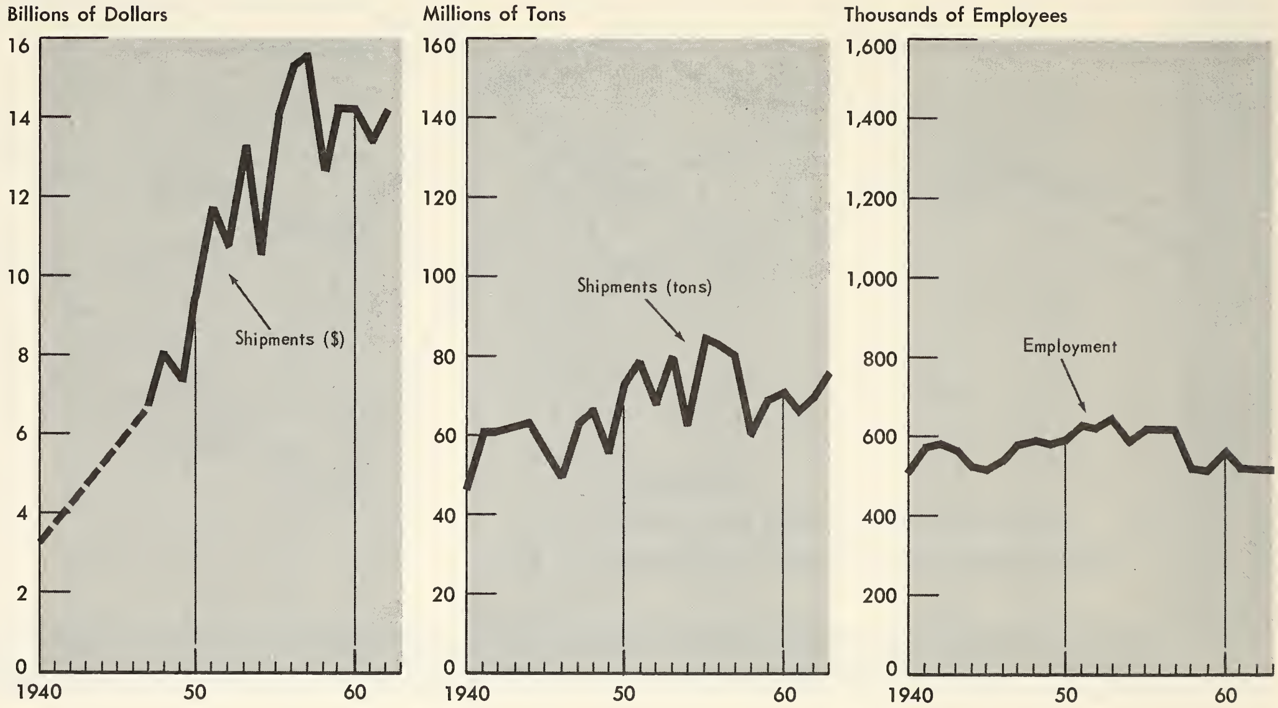
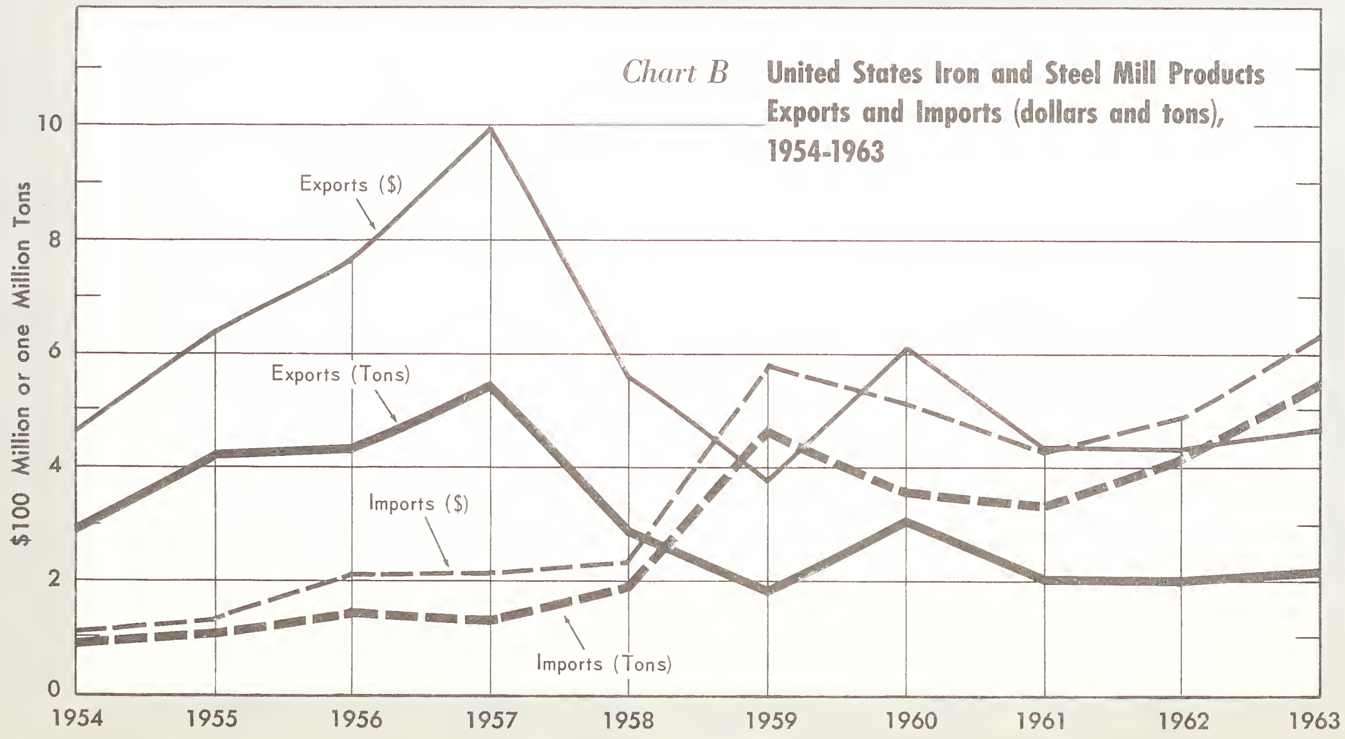


Chart B United States Iron and Steel Mill Products Exports and Imports (dollars and tons), 1954-1963



Nevertheless, in the battle with foreign-made steel, the domestic industry has some sizable assets with which to work. Perhaps the principal advantage is the extensive reserves of iron ore (principally in North America) and coal which can be delivered to U.S. mills at relatively low cost. Most foreign mills, both in Europe and Japan, depend upon other continents for sizable portions of their raw material requirements.

Moreover, in competition with imported steel, domestic mills can offer quick service in the form of shorter lead times, quick adjustment of subspecification steel, and close engineering assistance in solving fabricators' processing problems.

As for imports, the sharp difference in wage rates helps foreign mills overcome other cost disadvantages in shipping steel to this country.

Exports are vital to the European Coal and Steel Community (ECSC) and constitute about 25 percent of total output. The United Kingdom exports some 17 percent of its production, Japan 10 percent, the Soviet Union 6 percent, and the United States 3 percent (down from 7 percent in 1957).

Canada and Japan were responsible for the bulk of the drop in U.S. exports in recent years, as locally made steel replaced U.S. products in these nations. Japan, the Common Market countries, and the United Kingdom also have made sizable inroads into other foreign markets once significant to U.S. mills.

In 1963, some 48 percent of U.S. exports went to Asia (largely Pakistan and India under the foreign-aid programs), about 20 percent to Latin America, some 14 percent to Canada, and 14 percent to Europe (of which over half was shipped to the Common Market countries).

On a tonnage basis, U.S. steel exports in 1963 equaled 40 percent of imports. In value, the U.S. was still a net exporter until the last half of 1961. The value of exports in 1963 was 26 percent less than the value of imports. Exports consist largely of high-quality, flat-rolled carbon and alloy steels with an average value of about $210 a ton compared with $118 a ton for imports.

As compared to total world steel trade, U.S. exports have dropped from nearly one-half of the total in the early postwar period to less than 10 percent in recent years.

In summary, the domestic industry does have an advantage over most foreign producers because of controlled sources of iron ore (both domestic and foreign), extensive reserves of high-grade metallurgical coal and limestone, and ready sources of scrap. Lower material costs do offset much of the U.S. industry's disadvantage in labor rates.

The map following the text of this report illustrates the geographical relationship of steel product imports to domestic ingot production capacity. Each import (small) dot represents 50,000 tons of steel products. Each capacity (large) dot represents 1,000,000 tons of ingot production capacity, but closer to 500,000 tons of steel products output because of undercapacity operation of the mills and weight loss of the steel through fabrication into steel-mill products. Thus, each capacity (large) dot is about equal to 10 of the import (small) dots.

Future Prospects of the Steel Industry

The long-term trend in U.S. steel output has been definitely upwards, although at a slightly declining rate. There have been periodic contractions during recession years and a pronounced drop and recovery during the thirties. The recession years of 1949 and 1954 saw contractions in steel production, as did the year 1958. Output since 1958 has shown an upward trend again—85.2 million tons in 1958 (down from the peak 117.0 million tons in 1955), 98.3 million tons in 1962, 109.2 million tons in 1963, and an estimated 115 million tons for 1964. Prospects for the more distant future are clouded by possibilities of extension or reversal of several unfavorable trends:

- The recent adverse foreign-trade balance in steel. The increase in direct imports and the decline in direct exports between the periods 1954–56 and 1960–61 have meant a net loss of steel shipments averaging nearly 3½ million tons per year.
- The increased competition of other materials with steel. American Iron and Steel Institute and other sources estimated that nearly 2,000,000 tons per year (about two percent) can be identified as having shifted, at least temporarily, to other materials in uses which can be measured with reasonable accuracy.
- Gradual liquidation of steel inventories by companies in the steel-consuming industries, which was a reversal of the gradual build-up of the inventories that occurred in the early 1950's.
- Slackened business spending for plant and equipment (some reversal of this factor has already begun).
- Slackened consumer spending for durables.
- The long-term drop in steel usage by the railroad and oil industries.
- The lower usage of steel per unit as in compact cars and lightweight cans.

A few speculative remarks can be made about the above-listed factors.

Some of these factors have done nearly all the damage they can. This is largely true for inventory liquidation, the long-term decline in railroad and oil industry takings, the effects of the introduction of the compact car, and the shrinkage in exports. The same may also tend to be true for the inroads made by steel imports, as the disparity between the favorable U.S. raw material position and the relatively unfavorable foreign position becomes more pronounced while the gap between U.S. and foreign wages narrows. Moreover, foreign producers may already have penetrated the easy-to-enter U.S. markets, and gaining entrance into additional lines could be much slower and more difficult. No indication of this trend has been evidenced thus far, however, and 1963 import tonnages reached a new peak.

The demand for durable materials can be expected to pick up substantially later on in the 1960's as millions of young people who were born early in the "baby boom" of the 1940's get married and begin buying automobiles, appliances and other durable goods, and create demand for apartment buildings, all of which use steel. In addition, higher replacement demand is in prospect for automobiles, appliances, and other products, which were bought in huge quantities before the economy's growth rate slowed around 1957. Further, the coming obsolescence of plant and equipment injected into the economy at a high rate between 1942 and 1955, coupled with the pressure that higher consumer durable demand will put on plant capacity, will bring a marked improvement in business spending for steel-using plant and equipment. Commercial, public utility, educational, highway and other construction is also expected to expand appreciably in years ahead.

Resumption of a growth trend by the domestic steel industry thus depends primarily upon strength in demand for consumer durables and increased industrial construction.[2] Further, steel production in the latter half of the 1960's cannot be expected to reach earlier projections of from 125–140 million tons annually, because of the change in the foreign-trade balance and increasing usage of lighter-weight steels, such as double-reduced tin-plate and high-strength structural shapes.

Assuming that the industry is reasonably successful in overcoming most of its difficulties, an ingot production rate of between 115–130 tons annually is all that appears feasible during the latter half of the 1960's.[3] If no new expansion of steel industry capacity occurred in the meantime (an impossibility—some is being built now), this would mean operating rates of between 75 and 85 percent of capacity by 1970. The nature of operating rates and steel capacity is discussed in the following section.

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[2] It will also depend on the battle between steel and competing materials. The essential factors in this competition are as follows:

Plastics are appearing in varied forms from bottle caps to complete bottles.

One-way bottles of glass for beer and soft drinks are being pushed. New adhesive tapes are being designed for use as strapping.

Enameled carbon steel and stainless steel compete with aluminum, glass, brick, tile and precast concrete in the curtainwall field.

Competition between steel and concrete is expected to continue to be keen for years to come.

Aluminum cans are being used now for motor oils, frozen citrus juice concentrates, and beer. Aerosol cans of this metal are on display, and babyfood cans are promised. Rigid foil is being used for boxes and food trays. Cartons for soft drinks have been designed, and large aluminum containers for cargo are being widely discussed.

In applications where light weight and long-term corrosion resistance are important, aluminum has a substantial edge over steel in performance but not usually in price. At one time, steel's susceptibility to corrosion was considered a commercial advantage because it meant a larger replacement market. Now, accent is on overcoming this inherent disadvantage through improved coating materials (zinc, aluminum, tin, paint, and plastics) and more alloys.

Also, thinner tinplate, light-weight structural sections, expanded steel pipe and special grades of stainless steels are beginning to recover some of the markets temporarily invaded by aluminum, concrete, and nonferrous alloys.

[3] This is an extremely rough projection and assumes, on the one hand, no spectacular unforeseen difficulties for the steel industry, and on the other, that no substantial new steel markets will open up and that national unemployment rates will not be decreased materially.

CAPACITY UTILIZATION

Trends in Capacity Utilization [4]

According to current (September 1964) estimates, the steel industry should have operated at approximately 73 percent of capacity for all of 1964. This represents a modest recovery from the depressed annual levels of 71, 64, 65, 67, 63, and 61 percent for the preceding six years, but is still well below the earlier postwar (1947–1957) average of nearly 90 percent. The overall average annual operating rate (production as a percent of capacity) since World War II (1947 to estimated 1963) was roughly 80 percent. Table 1 (iron) and Table 2 (steel) list capacity and production data since 1947. The foregoing figures refer to Table 2.

The above-cited figure of 80 percent has also prevailed on a longer-term basis. Since 1916 the steel industry has operated above 80 percent of capacity in 22 years and below 80 percent in 25 years. Eight of the 22 "80 percent-plus" years were war years, while 10 of the 25 "80 percent-minus" years were during the depressed 1930's.

Thus, over both medium and longer terms, the steel industry's operations have deviated from a center figure of around 80 percent of capacity. In 7 of the years since 1916 the industry operated under 60 percent of capacity, in 11 years it operated between 60 and 70 percent, while in 12 years it has operated at over 90 percent of capacity.

The steel industry's operating rate has also varied quite dramatically on a month-to-month basis during a given year. Chart C shows monthly operating rates for the industry from 1955 to 1962. Adjusting partially for the exaggerating effect of strike periods and the inventory build-up and replacement periods on each side of the strike periods, the industry's operations appear to fluctuate over a range of about 30 to 40 percentage points. Five times in the past eight years, operations exceeded 85 percent of capacity; four times in the past seven years, they fell below 50 percent. While some of the wideness of this range may be caused by the anticipation of strikes that do not materialize, a fair and growing part of it is undoubtedly due to the reduction in steel-consumer inventories over the past several years and the consequent need for the industry to vary its production levels more directly in line with those of its customers. In the years following World War II, steel consumers purchased steel whenever they had the opportunity to do so and maintained sizable inventories against the prospect of rising steel prices and periods of tight steel supply. Now that steel prices have, to a large extent, leveled off and steel orders can

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[4] Capacity utilization on a regional basis will be discussed later in the section on Steel Industry Location.

TABLE 1

Number of Blast Furnaces, Capacity, Production and Capacity Utilized, 1947–1962 United States

Year	*Number of furnaces* [1]	*Capacity* [2] *(millions of net tons)*	*Production (millions of net tons)*	*Percent of capacity used*
1963	247	(3)	72.4	(3)
1962	259	---	66.3	---
1961	260	---	65.3	---
1960	263	96.5	67.3	69.7
1959 [4]	366	94.6	60.8	64.3
1958	265	91.0	57.8	63.5
1957	262	86.8	79.3	91.4
1956 [4]	261	85.5	76.0	88.9
1955	261	84.0	77.8	92.6
1954	260	82.0	58.7	71.6
1953	258	79.4	75.9	95.6
1952 [4]	251	73.8	62.2	84.2
1951	250	72.5	71.2	98.3
1950	248	[2] 71.6	65.4	91.4
1949 [4]	246	70.5	54.2	76.8
1948	239	67.4	61.0	90.5
1947	233	65.7	59.3	90.3

[1] Includes blast furnaces that make pig iron and ferroalloys. Does not include annual capacity of blast furnaces which have been long idle.

[2] Annual average capacity as of January 1 and July 1.

[3] Capacity is not available after 1960.

[4] Years of major steel strikes.

Source: *Annual Statistical Reports,* American Iron and Steel Institute.

be filled within a relatively brief span of time (barring strikes), there is little need for steel consumers to hold large inventories.

Moreover, steel producers do not hold steel inventories of any appreciable size, either, apparently preferring to vary their operating rates rather than to store steel. This suggests the possibility that the difficulty and expense of storing steel may roughly approximate that for maintaining so-called "excess" capacity. If this latter statement is true or tends to be true, it is doubtful that the steel industry will ever attempt to operate near full capacity for any extended, non-war period of time. In fact, it never has.

Steel Industry Profits

The following listing is a brief history of post World War II trends in the steel industry profits and the effects on these profits of industry operating rates and price-wage relationships:

- Profit margins widened between 1947–1950 on a sharp rise in prices not accompanied by a commensurate increase in wages; operating rates fluctuated sidewise during this period.
- Profits dropped during 1950–52 on a worsening price-wage relationship and a minor deterioration in operating rates.
- Profits rose in 1952–1955 on a reversal of the price-wage relationship and a volatile sidewise movement in operating rates.
- Profits slipped slightly in 1955–1957, as did operating rates, both

TABLE 2

Steel Capacity, Production, and Capacity Utilized, United States, 1947–1962

Year	*Capacity* [1] *(millions of net tons)*	*Production (millions of net tons)*	*Production as a percent of capacity*
1963	[2] 155	109. 3	[2] 71
1962	[2] 153	98. 3	[2] 64
1961	[2] 151	98. 0	[2] 65
1960	148. 6	99. 3	66. 8
1959 [3]	147. 6	93. 4	63. 3
1958	140. 7	85. 3	60. 6
1957	133. 5	112. 7	84. 5
1956 [3]	128. 4	115. 2	89. 8
1955	125. 8	117. 0	93. 0
1954	124. 3	88. 3	71. 0
1953	117. 5	111. 6	94. 9
1952 [3]	108. 6	93. 2	85. 8
1951	104. 2	105. 2	100. 9
1950	100. 0	96. 8	96. 9
1949 [3]	96. 1	78. 0	81. 1
1948	94. 2	88. 6	94. 1
1947	91. 2	84. 9	93. 0

[1] As of January 1, except for 1950, which are an average of data as of January 1 and July 1.

[2] Official figures on steel capacity are no longer being issued. Estimates used assume a growth in capacity of approximately one and one-half percent for 1961, 1962, and 1963.

[3] Years of major steel strikes.

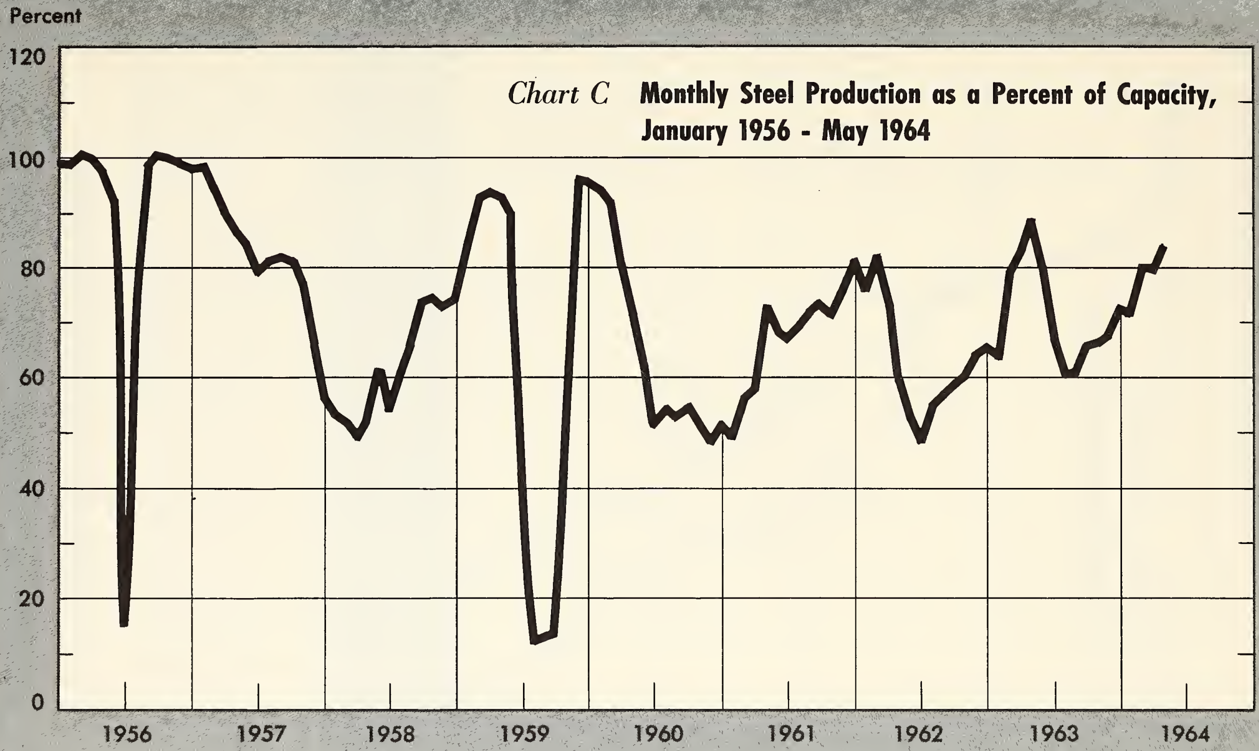
Sources: Business and Defense Services Administration and American Iron and Steel Institute, *Annual Statistical Report.*

movements ignoring improvement in the price-wage relationship.

Profits deteriorated steadily from 1957 to 1962, reflecting volatile but less favorable price-wage relationships; some recovery was scored in 1963 on greater production. The operating rate dropped sharply in 1958 and showed a slow, irregular upward movement from 1958–63. Overall, price-wage relationships appear to have had a greater impact on profits than have changes in operating rates, except that both have been significant and that operating rates directly affect the price-wage relationship (a rise in operating ratios reduces fixed wage costs per ton). Costs other than labor either vary directly with production levels or are relatively fixed. Longer-term trends (since World War II) show a moderate decline for material and service costs, and advances in depreciation and other costs (interest charges, State and local taxes). Profits (the residual cost) have been quite volatile but have not shown any particular trend except for the recent decline.

Chart D shows trends in prices for basic steel and for all commodities since 1940. Steel prices were more readily controlled during the earlier World War II years and thus lagged behind those for all commodities. However, once the war ended and price controls were removed, steel prices shot steadily upward and by 1955 had overtaken prices for all commodities. Steel prices continued to mount until

Chart C **Monthly Steel Production as a Percent of Capacity, January 1956 - May 1964**



Source: American Iron and Steel Institute

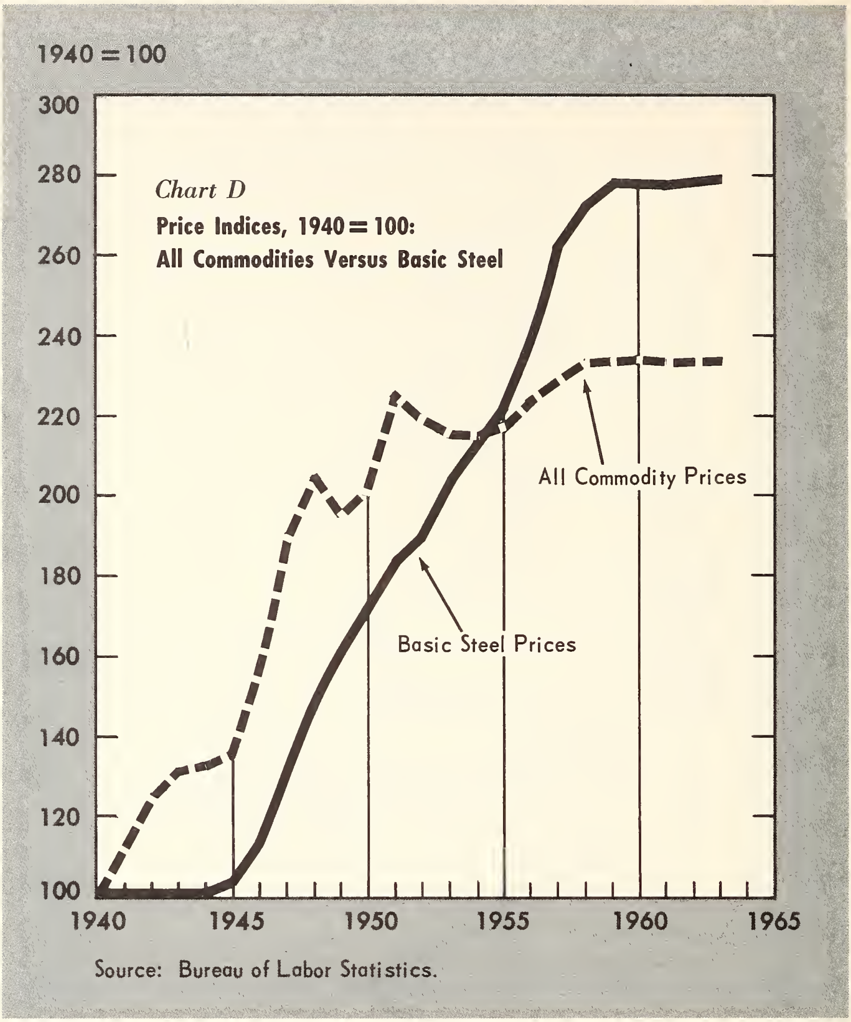


Chart D

Price Indices, 1940 = 100:
All Commodities Versus Basic Steel

Source: Bureau of Labor Statistics.

TABLE 3

Relation of Steel Industry Operating Rates (Production as a Percent of Capacity) to Profit Margins (Income Before Taxes as a Percent of Sales), Based on Quarterly Data, 1950 to 1962

Average operating rate for quarter	*Average profit margin for quarter*
100 and over*	14. 2
95–100	15. 5
90–95	14. 3
85–90	11. 9
80–85	12. 3
75–80	---------
70–75	10. 5
65–70	9. 1
60–65	8. 3
55–60	5. 2
50–55	7. 7

*Ranges up to 106 percent.

Sources: *Annual Statistical Report,* American Iron and Steel Institute and *Quarterly Financial Report for Manufacturing Corporations,* Federal Trade Commission and Securities and Exchange Commission.

1959, when they leveled off, as did all commodity prices. A slight recent rise in prices, plus the prospect of modest further recovery in operating rates over those of the past six years, suggest further improvement in profit levels.

Table 4 was constructed to evaluate the adequacy of steel industry profits as compared to those of all manufacturing and as compared to the steel industry's own historical average. For this purpose, profits after taxes as percent of stockholder's equity were used. On this basis, the average profit ratio since 1946 amounted to 9.7 percent for the steel industry, as against 11.2 percent for all manufacturing. Steel industry operating rates since 1946 averaged 80.5 percent as compared with 85.2 percent for all manufacturing. In the six years since the 1957 downturn, steel industry profit ratios averaged 6.8 percent as against 9.4 percent for all industry. Thus, steel industry profits now lag much further behind all manufacturing profits than has been the case historically. Close examination of the data indicates that steel industry operating rates would have to advance to between 75 and 85 percent of capacity before steel industry profits would have parity with those of all manufacturing or before the industry would match its own 1946–63 average. At present, steel industry profits are depressed on both a relative and a historic basis.

Profits and Capacity Utilization

Chart E illustrates the relationship of profit margins to industry operating rates, with profit margins plotted on the vertical scale and operating rates on the horizontal scale. Each dot on the chart represents the operating rate and profit margin in one three-month period (one quarter) during the years 1950 through 1962. While the dots on

TABLE 4

Profits After Taxes and Percent Utilization of Capacity, Steel Industry and All Manufacturing, 1947–62

Year	*Profits after taxes as percent of stockholders equity* [1]		*Percent utilization of capacity*	
	Steel	*All manufacturing*	*Steel*	*All manufacturing*
1947	11. 7	15. 1	93. 0	87
1948	13. 9	15. 5	94. 1	86
1949	9. 8	11. 4	81. 1	78
1950	13. 8	15. 0	96. 9	88
1951	12. 1	11. 8	100. 9	91
1952	8. 3	10. 2	85. 8	90
1953	10. 5	10. 4	94. 9	93
1954	7. 9	9. 8	71. 0	83
1955	13. 1	12. 3	93. 0	90
1956	12. 3	12. 0	89. 8	89
1957	11. 1	10. 7	84. 5	85
1958	7. 1	8. 4	60. 6	76
1959	8. 0	10. 2	63. 3	85
1960	7. 3	9. 1	66. 8	83
1961	6. 1	8. 7	[2] 65	82
1962	5. 4	9. 6	[2] 64	86
1963	7. 1	10. 3	71	86
				87 88 } 1964

[1] Stockholders' equity is based on book value at year end.

[2] Official figures on steel capacity are no longer being issued. Estimates assume a growth in capacity of approximately 1½ percent for 1961 and for 1962.

Source: Federal Trade Commission and Securities and Exchange Commission; American Iron and Steel Institute; Board of Governors of the Federal Reserve System.

Chart E are quite scattered, reflecting the effects of factors other than changes in the industry operating rate, a definable pattern of direct relationship between the size of profit margins and operating rates is indicated. The scattering shows that factors other than operating rates are potent influences on profit margins, too.

Chart F shows the same data with the effects of factors other than operating rates partially averaged out (through a five-period moving average based on a ranking of operating-rate ratios). This chart more clearly portrays the tendency of profit margins to widen as operating rates rise toward 100 percent. There is an indication of deterioration of margins as operating rates reach or exceed 100 percent of capacity but, up to 90 percent and slightly beyond, there is a fairly definite widening of profit margins.[5] (See Table 3.)

This indication of deterioration of profit margins at the right-hand side of the scale is more significant than it first appears, however. Obviously, since the industry has managed to operate in excess of 100 percent of capacity in seven isolated quarters, the absolute total

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[5] Theoretically, a rise in operating rates would be profitable even if the trend line on the chart ran horizontally, or somewhat downward.

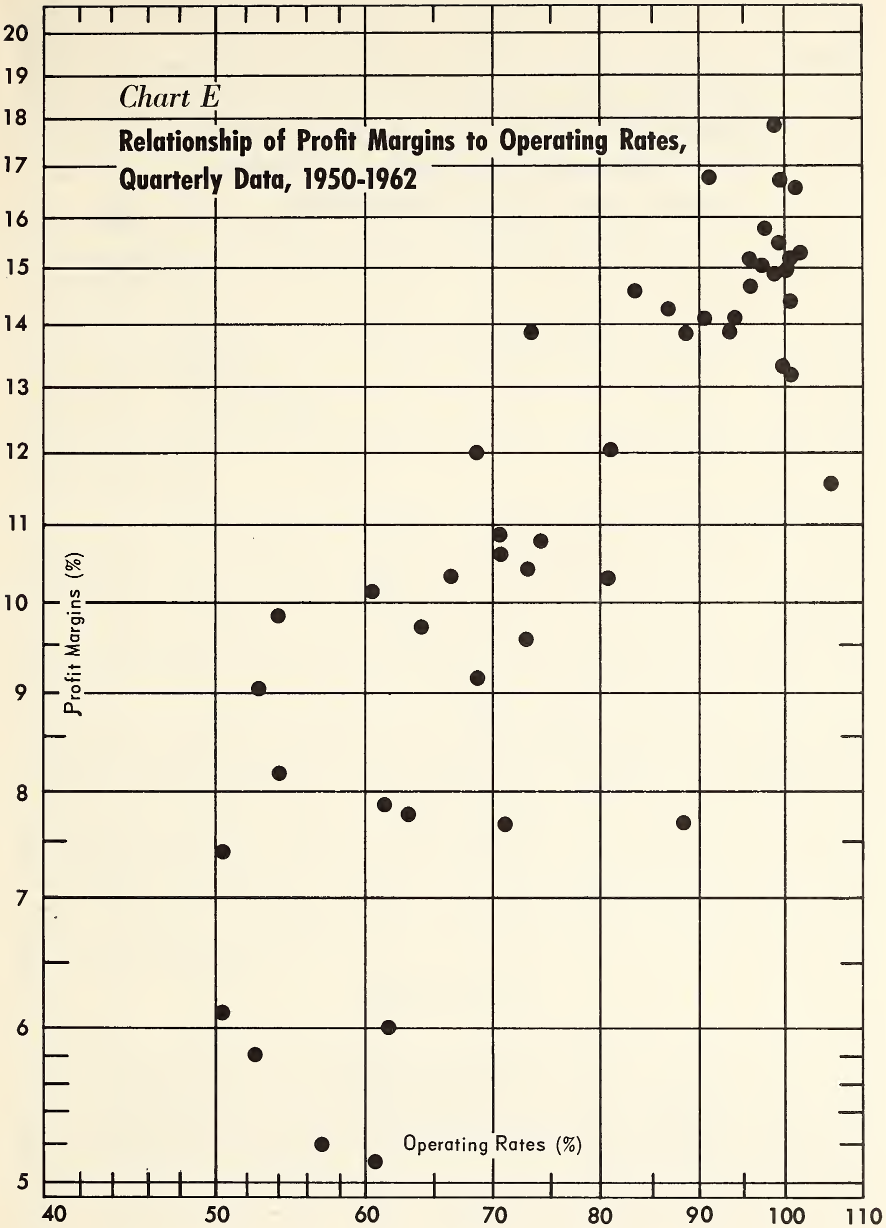

Chart E

Relationship of Profit Margins to Operating Rates, Quarterly Data, 1950-1962

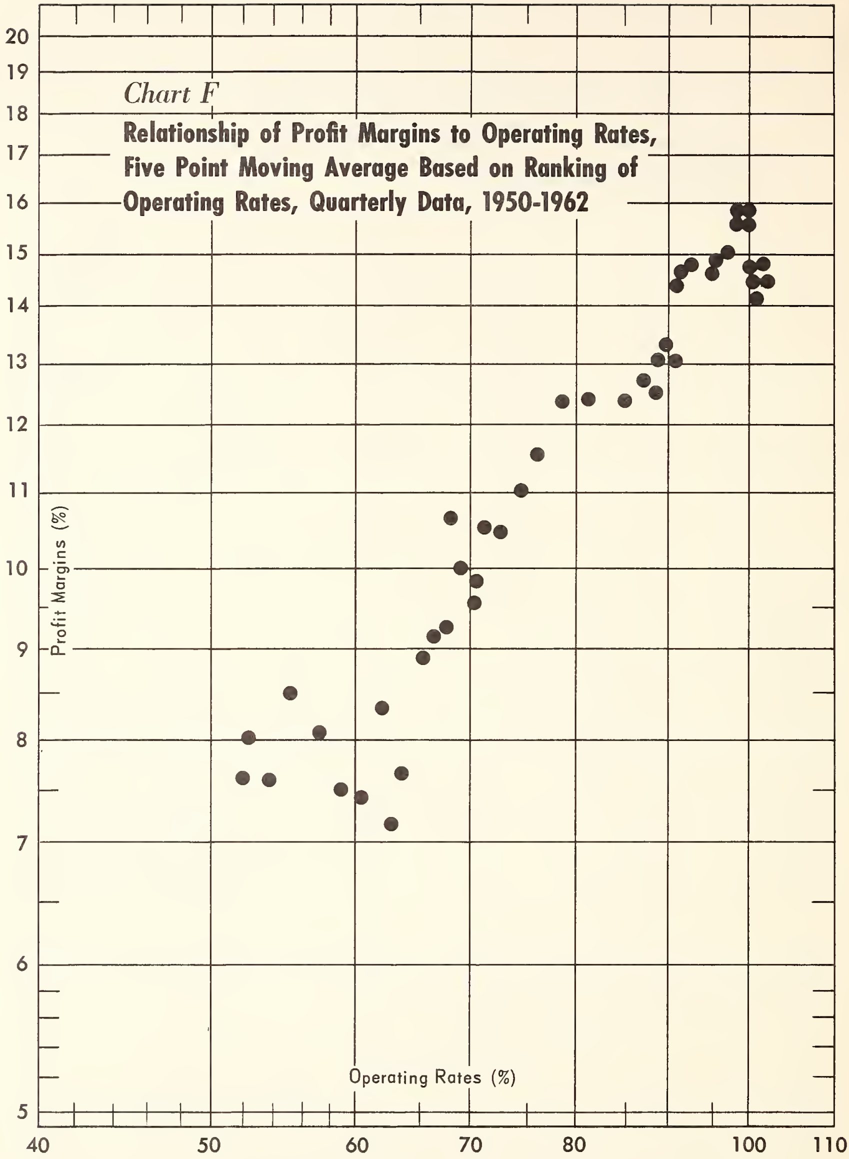

Chart F

Relationship of Profit Margins to Operating Rates, Five Point Moving Average Based on Ranking of Operating Rates, Quarterly Data, 1950-1962

capacity of the industry on a short-range basis exceeds that indicated on the chart. This "additional" capacity is accounted for by the fact that the American Iron and Steel Institute computes capacity figures after an 8.7 percent deduction allowing for time lost on account of rebuilding, relining, repairs, and holiday shutdowns. Thus, for a realistic measure of available capacity on strictly a short-term basis, the scale at the bottom of Charts E and F would have to be moved 8.7 percentage points to the right, since all capacity is operated at one time or another (during peak production periods) except that, in effect, the capacity of each individual facility has been discounted by 8.7 percent.

Moving the scale to the right by 8.7 percentage points to account for the short-range character of the data places the point at which profit margins appear to deteriorate closer to 90 percent, rather than at just short of 100 percent as the chart now indicates. This also pushes the point at which profit margins cease to widen materially back to about 85 percent (this aspect is more clearly seen in Chart E than Chart F).[6]

The conclusion is drawn that no consistent expansion in profit margins occurs after production reaches 85 percent of capacity, although total profits may continue to increase as a result of the greater volume. After 90 percent, even this latter point is subject to debate.

The main purpose of the foregoing analysis is to determine whether all of stated industry capacity is usable and profitable, or whether some facilities are so obsolete as not to constitute valid capacity. The chart indicates that, at least for short periods, the steel industry can operate up to about 90 percent of its total capacity quite profitably.

Thus, the stated production capacity of the industry did not include obsolete plant facilities in excess of 10 percent of the total during the period 1950 through 1962. "Peaking requirements" (the need for the industry to produce steel at varying rates in line with the demands of its customers) may call for the maintenance of more than 10 percent in "excess" long-term capacity, but no more than 10 percent of total steel industry production capacity can be considered as being unprofitable or obsolete facilities, and almost none of the facilities can be considered unusable.

Obsolescence

Rarely does a new industrial process represent such a complete improvement over an existing process that it makes the existing facilities so obsolete and impractical that they must be abandoned regardless of physical condition. Innovation in steel-making processes has been continuing for some time, but abandonment of older processes has been slow, reflecting deterioration of facilities and shifting location requirements more than obsolescence. Nevertheless, several developments in recent years appear to have at least the potential for effecting dynamic changes in the steel-making process, that is, potential for something more than just evolutionary changes. Evolutionary changes occur when existing facilities are altered to a moderate extent to accommodate a newly developed process, or when additions to capacity involve technical innovation, rather than when existing facilities are abandoned on a large scale because their design is no longer practical.

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[6] Part of the peaking of dots that occurs at between 97 and 100 percent on Chart F is caused by the fact that, for the most part, the years in which the industry operated at these high rates were also years in which profit margins were wide because of cost-price relationships. The dots between 90 and 95 percent were in years of less favorable cost-price influences. These facts were confirmed by close study of the data on a year-by-year basis, Chart G, which further ruled out the effects of factors other than operating rates on profits. The individual yearly charts also strongly support the conclusions reached as to the general trend of profits vis-a-vis capacity rates, as portrayed by Charts E and F.

The following newer developments in steel-making facilities are listed in rough order of their evolutionary character.

- *Oxygen injection in open hearths.* Progress in open-hearth steelmaking, already marked in the past few years, is expected to advance further over the not-too-distant future with wider usage of oxygen and improving know-how in injection of gas. Already, an open hearth has produced 1,000 tons of steel in an hour, double the maximum rate a few years ago, as the injection of oxygen through roof lances raises temperatures and speeds up the refining time (some furnaces are down to 6 hours tap-to-tap, against a previous 12–16 hours).
- *Improved blast furnaces.* Gains in efficiency have also been marked in the case of blast furnaces, which reduce iron ore into molten iron for the steel-making furnaces. This has been accomplished by upgraded ore (especially in the form of pellets and sintered material), improved coke, higher temperatures and pressures, fuel injection (oil, gas, or fine coal), automatic controls, and the construction of larger furnaces. The improvement in blast furnaces (the iron-making process) has been a sizable factor in reducing steel ingot costs.

The upgrading of ore not only reduces costs (in blast furnace operations, that is—the upgrading of ore costs money) but substantially enlarges blast furnace capacity as well. These ores, whether high-grade foreign, direct-shipping ores or domestic and foreign concentrates, are 60 percent-plus in iron content, as compared with the historic standard of 52 percent. To the extent that they supplant the lower-grade product in use historically, a 20-percent richer charge in the blast furnace is almost the equivalent of a 20-percent increase in blast furnace capacity.

Since the current study is concerned with a period which is relatively short in length, that is to say, 5 or 10 years, this would seem to guarantee that very little net new blast furnace capacity will be constructed for the Nation as a whole except as such new capacity is economical when old furnaces are replaced. The capacity-enlarging effects of oxygen injection in open hearths would tend to have a similar impact on expansion of the steel-making process.

- *Improved rolling mills.* New designs of rolling mills attain much greater speeds, produce a wider product and incorporate remarkable advances in instrument controls.
- *The basic oxygen furnace.* Despite the increasing productivity of open hearths, the basic oxygen process is expected to gain rapidly over coming years both where new capacity is needed and where cost savings necessitate the abandonment of smaller open hearths. The oxygen process can cut production costs (that is, conversion of the metallics into steel) about $3 a ton below those of an efficient open hearth and close to $10 a ton below those of some units now being displaced by this process, despite a lower yield of 87 percent metallics against 92 percent in open hearths. In addition, capital investment

per ton of annual capacity is about $15–$20 a ton, less than half that of an open hearth. The latest oxygen furnaces produce over 200 tons of steel per hour, and a normal production rate of 300 tons is anticipated. A major disadvantage of the oxygen furnace (which uses about 1,800 cubic feet of oxygen per ton of ingot produced) is the necessity for a high hot metal charge; if a mill is short of blast furnace capacity, this capacity would have to be built and total capital investment could easily be doubled.

- *Continuous casting.* In addition to the growing popularity of the lower-cost oxygen steel-making furnaces, and emphasis on fuel injection and pelletized ore to reduce iron-making costs, the industry is moving ahead in other areas. One major interest currently is continuous casting. This processing step (already in commercial use in Europe and Canada) is being investigated by all leading U.S. steel producers. Several U.S. producers have already ordered continuous casting machines.

In simple terms, continuous casting consists in taking molten steel from the steel-making furnaces, pouring it into a water-cooled mold, and cutting it into the semifinished form (slabs, billets, or blooms). Continuous casting machines eliminates ingot mold, soaking pits (essentially heating furnaces), and slabbing or blooming mills, which are the next three steps of the steel-making process after the steel furnace.

Continuous casting has the advantage of sizable cost savings from eliminating the steps above, substantially lower investment cost versus that for a conventional installation, considerably less land requirements (an important consideration in most steel mills, which generally are cramped for space), and a much lower scrap loss. Work so far has been very encouraging, but continuous casting has not yet fully met commercial requirements in terms of quality and quantity production needed in large plants making thin-gauged, flat-rolled steels. Given time, these problems may be solved. Continuous casting is not expected to make the conventional process obsolete. Rather, it will gradually be introduced where needed in new plants or for replacing marginal existing units, much as the oxygen furnace is gradually replacing open hearths.

- *Direct reduction.* The possibility of making steel directly from iron ore, without going through the historical stages of the blast furnace and steel-making process, has long been a challenge. Many techniques for doing this have been proposed, some of them quite imaginative. A few have proved feasible technically, but to date none have been able to beat the costs of more conventional processes. The potential gain from a successful idea is so great, however, that the search continues. The resurgence of blast furnaces reduces the present value of experimentation in the direct reduction of iron ore but, over the long term, direct reduction processes may well prove economic.

New Processes

Several new processes have been investigated by ARA. See: "Preliminary Engineering Studies for Application of the R–N Process to Lake Superior Region Iron Ores" (1963) $1, and ARA Staff Study, "The Role of ARA Technical Assistance in Major Iron Ore Problems of Redevelopment Areas" (1964) 10 cents, both for sale by the U.S. Department of Commerce, Washington, D.C., 20230.

EMPLOYMENT CHARACTERISTICS OF THE STEEL INDUSTRY

Labor Intensity

Total employment costs in the steel industry average about 40 percent of net billings. These costs vary considerably from company to company depending upon the efficiency of operations, the types of products, and the degree of integration (for example, companies operating their own ore and coal mines have proportionately higher labor costs than producers that purchase most of these raw materials). According to Census of Manufactures data, payroll represents about 23 percent of value of shipments from plants in the blast furnace and steel mill phase of steel production. This percentage is roughly the same as the all-manufacturing-plant average.

The industry has made considerable progress in increasing efficiency and in thereby reducing manpower requirements. In recent years, the average number of manhours per ton of finished steel shipped declined to 15.0 from an average of 18.4 manhours per ton in 1947–49.

Investment in blast furnace and steel mill plant and equipment per employee probably averages between $20,000 and $30,000, or two-to-three times the all-manufacturing average. Other labor factors are these:

- Annual payroll per employee is roughly $7,200, as against $5,600 for all manufacturing.
- Production workers constitute 81 percent of total steel industry employment as against 75 percent for all manufacturing.
- Value added by manufacture per employee is $13,300 as against $11,100 for all manufacturing.
- Men make up well over 90 percent of the work force as against only about 75 percent for all manufacturing.
- Average number of employees per plant (in 1958) was 1,760 as against 52 for all manufacturing.

In summary, the steel industry's labor intensity approximates the all-manufacturing norm. While value added by manufacture and value of shipments per employee are slightly above average, and investment per employee is large, the industry's employees receive higher wages and are more concentrated in production jobs than are those in manufacturing industries generally.

Wage Levels—Unionization

The average annual wage ($6,771 in 1962) for blast furnace and steel mill production workers is above that for all workers in the primary metals industry or any other major industrial category. Of more importance, the average wage represents a uniform wage (plant-by-plant) in this industry since steelworkers are almost completely organized on an industry-wide basis, and the dominant union (United Steelworkers of America) provides no southern or other geographical differential.

The full extent of unionization in the steel industry is illustrated by the following table:[7]

	Companies	*Capacity (tons)*	*Percentage*
Organized by the "Steelworkers"	64	136, 940, 870	92. 2
Organized by other unions	12	11, 138, 300	7. 5
Not organized	8	491, 800	0. 3
U.S. total	84	148, 570, 970	100. 0

Primary Metals:	*Percent exports to manufacturers' shipments*	*Percent imports to new supply (output plus imports)*
Tin-Mill Products	8	0
Concrete reinforcing bars	1	17
Structural shapes and piling	9	3
Ferroalloys	3	5
Steel nails and spikes	1	24
Pliers	8	31
Barbed and twisted wire	NA	51
Wire bale ties	NA	30

Source: Bureau of the Census, U.S. Department of Commerce.

Moreover, some of the "unorganized" companies remain so by paying wages and other benefits equal to or higher than those of organized companies. Thus, any new steel-making enterprise is unlikely to avoid paying rates near the all-industry average.

Unemployment Trends

Unemployment in the steel industry[8] exceeds that in most other industry categories, even though the steel industry is less seasonal or variable in its employment patterns. Of 13 primary manufacturing industries, only 3 have shown greater unemployment rates in recent years, and these 3 plus 5 others have greater seasonality in their employment patterns to account for their unemployment. (See Tables 5 and 6.) It thus appears that unemployment among steelworkers has been more a result of a genuine decline in job opportunities than is the case in any other major manufacturing industry. A sizable decline in steel industry unemployment occurred with this rise in production in 1963.

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[7] Data are for 1960 but have not changed much since.

[8] For this purpose, data representing the whole primary metals industry are used since a finer breakdown is unavailable. It is believed that any differences between steel industry figures and those for total primary metals industries would be in the direction stating unemployment characteristics more severely for steel. Average unemployment for all industries, 1958–1962, was 6.0 percent. The primary metals industry average was 7.8 percent. (See Table 5.) The steel industry percentage probably averaged even higher. The proportion of workers with work experience who worked year-round at full time jobs averaged 53.7 percent for all industry groups in 1958–1962. The average for the primary metals industry was 67.3 percent. (See Table 6.)

Another indication of the depressed state of steel industry employment is the sizable amount of steel-making capacity, 28 percent of the total, that is located in redevelopment areas. Only 17 percent of all manufacturing employment is so located. These areas, essentially Pittsburgh and nearby Pennsylvania and West Virginia counties, are the older steel-making centers, which are experiencing a declining position in the industry. Since this trend of regional decline is expected to continue, it is likely that any further expansion in industry capacity that tended to take its market from other domestic producers would probably take most of it from producers in redevelopment areas.

TABLE 5

Annual Unemployment Rates for Manufacturing Industries, 1958–1962 and Average

Industry	*1963* (%)	*1962* (%)	*1961* (%)	*1960* (%)	*1959* (%)	*1958* (%)	*Average 1958–1963* (%)
Total unemployed, all industries	5. 7	5. 6	6. 7	5. 6	5. 5	6. 8	6. 0
Manufacturing	5. 7	5. 8	7. 7	6. 2	6. 0	9. 2	6. 8
Lumber and wood products	8. 4	8. 4	11. 1	9. 1	8. 7	11. 6	9. 6
Furniture and fixtures	7. 3	6. 9	9. 2	6. 9	6. 9	9. 3	7. 8
Stone, clay, and glass	6. 3	6. 4	8. 1	6. 0	5. 3	8. 7	6. 8
Primary metal industries	4. 3	7. 0	10. 9	7. 8	5. 3	11. 4	7. 8
Fabricated metal products	5. 6	5. 4	6. 7	6. 1	6. 5	9. 1	6. 6
Machinery, except electrical	4. 1	3. 7	6. 4	4. 7	4. 3	9. 0	5. 4
Electrical machinery	5. 7	5. 0	6. 9	5. 0	5. 4	8. 7	6. 1
Transportation equipment	4. 4	6. 0	10. 0	6. 9	7. 1	13. 2	7. 9
Food and kindred	6. 5	7. 3	7. 7	6. 4	6. 7	8. 1	7. 1
Textile mill	6. 7	5. 2	6. 8	6. 3	7. 2	9. 5	7. 0
Apparel	9. 6	9. 8	11. 4	10. 5	9. 6	12. 0	10. 5
Printing and publishing	3. 6	3. 5	3. 9	3. 6	3. 2	4. 0	3. 6
Chemicals and allied	3. 3	3. 3	3. 3	3. 3	3. 6	5. 1	3. 6

Source: Special Labor Force Reports, Bureau of Labor Statistics.

TABLE 6

Proportion of Persons Who Worked Year-Round at Full-Time Jobs, by Industry Group, 1958–1962

Industry	*1963* (%)	*1962* (%)	*1961* (%)	*1960* (%)	*1959* (%)	*1958* (%)	*Average 1958–1963* (%)
Total workers, all industries	54.6	53.7	53.6	53.7	53.8	53.6	53.8
Manufacturing	67.1	64.8	63.7	64.3	62.5	62.3	64.1
Lumber and wood products	50.1	50.3	46.9	48.3	55.3	49.5	50.1
Furniture and fixtures	65.7	64.8	63.5	58.7	65.0	52.8	61.3
Stone, clay, and glass	72.4	62.0	64.0	63.4	66.0	63.4	65.2
Primary metal industries	73.9	69.1	67.8	63.5	*64.0	65.4	*67.3
Fabricated metal products	71.1	71.0	68.6	71.6	68.4	69.3	70.0
Machinery, except electrical	76.3	73.3	73.7	73.0	72.4	66.5	72.6
Electrical machinery	70.5	70.1	71.3	69.6.	69.1	68.2	69.8
Transportation equipment	75.2	70.1	61.0	65.4	61.5	58.6	65.3
Food and kindred	63.2	61.3	58.4	61.4	61.0	60.5	60.9
Textile mill	64.2	59.0	59.2	62.5	63.2	58.4	61.1
Apparel	45.4	44.0	44.8	38.6	44.5	43.9	43.6
Printing and publishing	52.2	51.4	54.5	60.1	57.7	59.5	57.3
Chemicals and allied	76.6	77.1	79.4	82.2	74.6	79.1	78.7

*The 1959 figure is adjusted to remove effects of that year's steel strike for the sake of computing a meaningful 5-year average. The actual 1959 figure was 47.8 percent.

Source: Manpower Report of the President and Bureau of Labor Statistics.

STEEL INDUSTRY LOCATION

Geographic Markets

The largest domestic market area for steel is Michigan, which takes some 14 percent of the total steel consumed in manufacturing (manufacturing accounts for over 70 percent of steel usage; other major users are the construction and extractive industries). Some 5 percent of the Nation's total is used in the Detroit area alone. Ohio takes about 13 percent, the major outlet being the automobile industry, as in Michigan. Other leading States include Illinois (with a wide diversity of customers) 12 percent; Pennsylvania, 10 percent; California, Indiana, and New York, 6 percent each; New Jersey, 3 percent; and Texas, 3 percent.

Current Location of the Steel Industry

The current location of the steel industry is best illustrated by the map on page 34 of this report.[9] The map shows steel ingot capacity annually, of domestic plants, one dot [10] for each 1,000,000 tons.

While the dots do not indicate the location of plants themselves, they do represent average (but not typical) plant size. Plant sizes actually vary widely. Of the industry's 149 plants (in 1960), 48 had annual capacities of less than 100,000 tons, 53 had 100,000 to 1,000,000 tons, and another 48 had from 1,000,000 to nearly 10,000,000 tons.

Roughly two-thirds of steel industry capacity (see map) is located within some 200 miles of the lower part of the Great Lakes. Pennsylvania (with 26 percent of total capacity), Ohio (19 percent), Illinois (9 percent), New York (5 percent), and the northern strip of West Virginia (2 percent) make up this concentration (67 percent). Smaller concentrations exist in Maryland (6 percent), Alabama (4 percent), Texas (2 percent), and California (3 percent).

Regional Operating Rates

Table 8 shows 1950, 1955, and 1960 steel furnace operating rates (percent of capacity used) and the percentages of total production

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[9] Also, Tables 7 and 8, covering blast furnace capacity and steel ingot production, respectively, show percentage breakdown on a State or regional basis, plus output as a percentage of capacity (operating rates) for these areas.

[10] The small dots on the map represent steel product imports of 50,000 tons each. On a comparable basis, the large capacity dots would represent roughly 500,000 tons of steel products because of under-capacity operation of the mills and weight loss of steel through fabrication into steel mill products.

Location of Basic Steel Industry Capacity by State and Steel Product Imports by Port of Entry

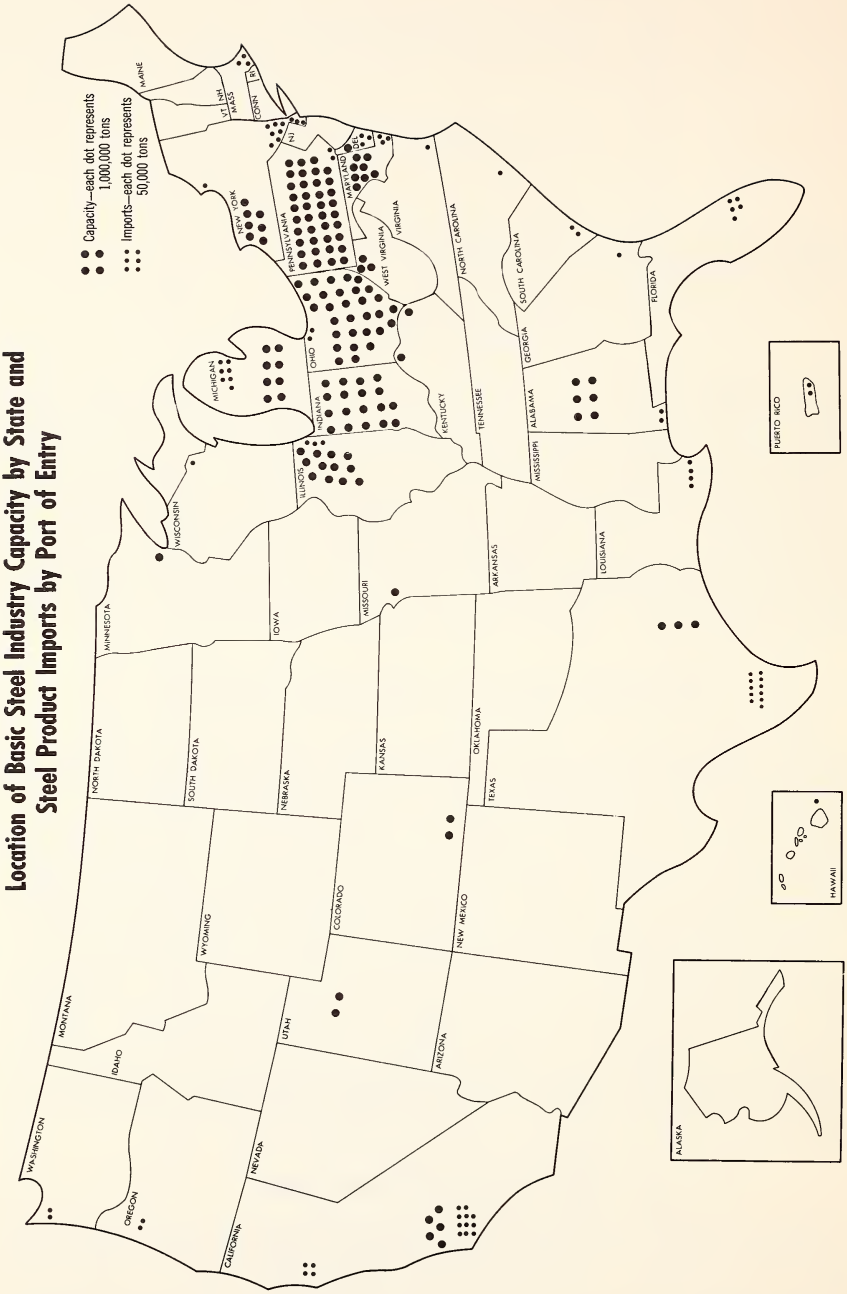

TABLE 7

Blast Furnace Capacity and Production by States, 1960

State	Capacity (net tons)	Production (net tons)	Percent of capacity
Massachusetts	195, 000	4, 357, 961	69–71
New York	5, 947, 000		
New Jersey	N.A.		
Pennsylvania	26, 381, 750	17, 043, 762	65
Ohio	18, 734, 500	12, 446, 019	71
Indiana	10, 324, 350	8, 403, 794	
Illinois	7, 955, 200	5, 307, 083	
Michigan	5, 290, 250	4, 980, 925	84
Minnesota	696, 000		
Virginia	128, 000	8, 332, 060	78–80
Maryland	5, 480, 000		
West Virginia	2, 646, 000		
Kentucky	1, 058, 000		
Tennessee	217, 740		
Texas	925, 000		
South Carolina	N.A.		
Alabama	5, 817, 440	3, 540, 702	61
Colorado	922, 400	3, 734, 737	79
Utah	1, 804, 200		
California	1, 997, 800		

Source: *Annual Statistical Report*, American Iron and Steel Institute.

TABLE 8

Ingots and Steel for Castings: Operating Rates and Regional Percents of Production: 1950, 1955, 1960

State	Percent of capacity used			Percent of total production		
	1960	1955	1950	1960	1955	1950
Eastern Seaboard	73. 5	93. 7	99. 8	12. 4	11. 6	11. 4
New York	69. 1	93. 6	100. 2	5. 2	5. 5	5. 0
Other Eastern Seaboard States (Mass., R.I., Conn., N.J., Del., Md.)	77. 0	93. 7	99. 5	7. 2	6. 1	6. 4
Pennsylvania	60. 8	90. 0	93. 2	24. 0	26. 5	28. 2
Ohio	60. 8	90. 7	95. 4	17. 4	19. 0	19. 5
Indiana	73. 4	96. 4	101. 0	13. 8	12. 7	11. 7
Illinois	64. 3	90. 0	97. 2	8. 3	8. 1	8. 5
Michigan	81. 8	92. 8	101. 0	6. 6	5. 3	4. 7
South (Va., W. Va., Ky., Tenn., Ga., Ala., Miss., Fla.)	73. 0	86. 6	100. 7	8. 2	7. 4	8. 1
Mid-Continent (Minn., Mo., Okla., Tex.)	67. 8	95. 3	104. 2	3. 1	4. 0	3. 7
Western	65. 0	90. 5	92. 0	6. 2	5. 4	4. 2
California	55. 0	91. 0	90. 2	2. 7	2. 5	2. 5
Other Western States (Wash., Oreg., Colo., Utah)	75. 2	90. 0	94. 6	3. 5	3. 0	1. 8

Source: American Iron and Steel Institute.

(not capacity) located in various steel-making States and regions. These figures give some indication of past production trends for various areas in the United States and the past and current adequacy of regional capacity, but they only partially point out the course for future expansion of the industry. The greatest relative declines in production are in the old steel-making centers in Pennsylvania and Ohio (Youngstown)[11]; these two areas also have scored lower-than-average operating rates. Mixed trends in relative production are evident for Illinois, the "South," and the "midcontinent"; operating rates were similarly in a middle range. Advances in production took place on the Eastern Seaboard, in Indiana, Michigan, and the West; operating rates were generally above average, except in the West where they were roughly average.

As of 1960, operating rates were the highest for Michigan, the Eastern Seaboard, Indiana, and the South. The West may also fall in this category since the depressed rate shown in Table 8 for California probably reflects the early settlement of the 1959 strike by one large West Coast producer and, therefore, less production in early 1960 to replenish strike depleted inventories. (See Chart C for an illustration of the strike effect on early 1960 national production.) Other areas were operating in line with their previously illustrated trends, with Pennsylvania and Ohio still on the bottom. It is important to note that none of the 1960 operating rates in Table 8 are so high as to indicate a regional shortage of steel supply.

The probable outlook for the years ahead is as follows:

- The future of the eastern district (Sparrow's Point, Morrisville, and Buffalo) will likely parallel the national trend, allowing for the continued effect of imports on selected product lines.
- A continuation of the long-term decline in the Pittsburgh-Youngstown area is indicated, possibly becoming more severe. This district is blocked to the east by Morrisville, to the north by Buffalo, and to the west by Cleveland and Detroit, growth trends for which are favorable.
- A high growth rate is indicated for Cleveland and Detroit.
- Chicago should grow at about the national rate, once the current expansion by Bethlehem Steel is completed.
- Southern mills should exceed the rate nationally.
- The western mills, essentially at Fontana, California, will show the sharpest gains.
- Future locational trends will be affected mainly by marked growth, changes in raw material characteristics, and advances in technology. In particular, the growth in use of high-grade ore burdens in the blast furnaces should further reduce the attraction of coal and

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[11] In the early stages of iron and steel development, plant location was determined by the point where iron ore and coal could be brought together most economically. As a general rule, iron ore had to travel to coal. Market location was somewhat secondary, but the Pittsburgh-Youngstown areas were fairly well centered in this respect, too. Developments in smelting techniques called for less use of coal over the years while markets moved to the west and south and became more dispersed generally. The industry that built up around Detroit and Chicago had the effect of making markets and iron ore pull against the declining coal. As a result, new steel capacity has tended to locate away from the older centers at Pittsburgh and Youngstown. This movement has been augmented somewhat by the growth in scrap supplies and the introduction of the steel-making electric furnace, which uses no coal or iron ore and finds its raw material, scrap, located at the market centers.

the advantages of those regions close to coal; most importantly, the Pittsburgh-Youngstown District could undergo a further decline in attractiveness for this reason, while the disadvantages of Fontana, California, and Geneva, Utah, could be reduced. These new high-grade burdens will reduce coke requirements from about 0.92 to about 0.74 ton per ton of iron.

- Shifts in the location of the steel industry are likely to be very gradual over the next several years, since existing capacities can be quite readily enlarged through the use of high-grade ore in the blast furnace and oxygen in the open hearths. In fact most of the shifts that do occur will probably come about through this upgrading of existing capacities at the favored locations.

PRODUCT GROUPS

Product Breakdown

As outlined in the flow chart on page 4, the product of the blast furnace is iron, iron processed through the steel furnace becomes steel, and steel fed through the rolling mill becomes a steel product. Principal steel products and their percentages of total steel product shipments (less shipments for further conversion by steel mills) are as follows:

- *Semi-finished products (4.2 percent)*—ingots and steel castings, blooms, slabs, billets, sheet bars, tube rounds, skelp, wire rods.
- *Shapes and plates (16.6 percent)*—structural shapes (heavy), steel piling, plates.
- *Rails and accessories (1.5 percent)*—rails, joint bars, tie plates, track spikes, wheels, axles.
- *Bars and tool steel (15.4 percent)*—hot rolled bars, reinforcing bars, cold finished bars, tool steel.
- *Pipe and tubing (9.3 percent)*—standard pipe, oil country goods, line pipe, mechanical tubing, pressure tubing.
- *Wire and wire products (4.1 percent)*—drawn wire, wire nails and staples, barbed and twisted wire, woven wire fence, bale ties and bailing wire.
- *Tin-mill products (7.8 percent)*—black plate, hot dipped tin and terne plate, electrolytic tin plate.
- *Sheets and strip (41.1 percent)*—hot-rolled sheets, cold-rolled sheets, galvanized sheets, other metallic coated sheets, electrical sheets and strip, hot-rolled strip, cold-rolled strip.

Growth Trends

The sheet, strip and tin-mill product categories have shown the greatest growth over the past 60 years, reflecting rising demand for containers and consumer durables and, to some extent, increased usage in construction, transportation, and the export market. Demand for bars has shrunk somewhat as a consequence since sheet and strip have been substituted for bars in many fields.

Pipe and tubing have increased in importance, with uses in the oil and gas industries more than offsetting declines in other sectors. The relative importance of shapes and plates has declined slightly because heavy construction has not grown as rapidly as other steel-using industries and because of increased use of other materials. Rod, wire and wire products have declined considerably as a consequence of changes in farm and construction technology and increased imports.

More recent trends in these categories tend to mirror those of the longer term, except that the slight decline in shapes and plates seems to have abated, and the trend in pipe and tubing appears more static.

Table 9 presents a more detailed breakdown of tonnage production of iron and steel products for the twelve years, 1952 through 1963. Production during the second half of this period has been averaged against that for the first half to give an indication of growth, or lack of such, for the various products. Only those products showing a comparative relationship of over 100 percent have exhibited an absolute increase in production—sheets 112.3 percent (or a 12.3 percent average five-year increase), coils for cold-reduced black plate and tin plate 102.5 percent (very little increase), concrete reinforcing bars 107.9 percent, the relatively small category of "all others" 123.6 percent, tin and terne plate 105.2 percent. Since raw iron and basic steel production showed declines to 90.7 percent and 91.5 percent, respectively (or average five-year drops of 9.3 percent and 8.5 percent), it is not strange that the production performance of individual product categories has been so unimpressive on an absolute basis. Relative gains can be attributed to those categories whose comparative percentages exceeded 80 percent. In other words, the faster-growing product categories will have percentage figures (on the top data-line of the table) in excess of 80 percent, the slower-growing categories less than 80 percent. On a quartile basis showing relative performance among groups, the fastest growing 25 percent had percentages of 100 percent and up; the 25 percent with the greatest declines had percentages below 65 percent.

Imports—Exports

While imports of steel products are equal to only five to six percent of the total domestic supply, the inroads made into individual product categories by foreign producers range from negligible to very sizable percentages. U.S. exports, although down sharply from early postwar experience, are still meaningful to producers of a few categories. For example, the following selected categories had either imports or exports of over five percent in 1958:

More detailed treatment is given the subject of imports in the following tables:

Table 10, which shows volume and trends of imports for major categories, 1952 to 1963, together with a percentage (on the first data line) indicating the relative growth of each import category, last five years versus first five years, and a percentage (on the first data line) estimating recent imports as a percentage of total domestic supply.

Tables 11 and 11–A, which attempt to relate 1960 imports to domestic operating rates for a sizable number of iron and steel product categories.

Table 12, which gives a lengthy and detailed list of imports and exports as a percent of domestic supply in the case of imports and domestic production in the case of exports, from the 1958 Census of Manufactures. This list, while providing extensive detail, is considerably out of date since many import percentages have risen sharply since 1958. (Refer again to Table 10.)

TABLE 9

Production of Iron and Steel Products, 1952 to 1963 (Thousands of tons)

	Pig iron and ferroalloys	*Ingots and steel for casting*	*Plates*	*Sheets*	*Black plate*	*Strip*	*Coils for cold reduced black plate and tin plate*
1958–1963 as percent of 1952–1957	90. 7	91. 5	80. 4	112. 3	--------	52. 2	102. 5
1963	72, 375. 3	109, 260. 9	8, 182. 3	33, 794. 5	--------	1, 467. 2	7, 200. 5
1962	66, 291. 0	98, 327. 8	7, 136. 5	30, 366. 9	--------	1, 468. 4	6, 923. 9
1961	65, 294. 9	98, 014. 5	6, 902. 8	28, 399. 3	--------	1, 482. 5	7, 908. 7
1960	67, 320. 1	99, 281. 6	7, 449. 5	29, 815. 4	--------	1, 548. 8	7, 957. 5
1959	60, 829. 4	93, 446. 1	7, 028. 6	26, 830. 1	--------	1, 873. 3	6, 385. 9
1958	57, 764. 1	85, 254. 9	6, 622. 2	23, 061. 1	--------	1, 749. 3	7, 035. 6
1957	79, 338. 9	112, 715. 0	11, 276. 5	26, 299. 4	--------	2, 214. 7	7, 277. 8
1956	75, 959. 6	115, 216. 2	9, 432. 4	29, 277. 4	--------	2, 882. 0	7, 577. 7
1955	77, 789. 7	117, 036. 1	8, 191. 0	31, 517. 3	--------	3, 683. 6	7, 579. 4
1954	58, 686. 9	88, 311. 7	6, 519. 9	21, 886. 6	--------	2, 436. 1	6, 751. 4
1953	75, 856. 9	111, 609. 7	9, 781. 0	25, 918. 8	--------	3, 908. 8	6, 998. 8
1952	62, 150. 9	93, 168. 0	8, 702. 5	18, 549. 3	--------	3, 259. 3	6, 171. 7

Source: Area Redevelopment Administration, U.S. Department of Commerce.

TABLE 9–A

Production of Iron and Steel Products, 1953 to 1962 (Thousands of tons)

				Bars				
	Hoops	*Cotton ties and baling bands*	*Total flat rolled*	*Merchant*	*Concrete reinforcement*	*Light shapes*	*Heavy structural shapes*	*Steel piling*
1958–1963 as percent of 1952–1957	51. 4	------	100. 0	80. 5	107. 9	86. 8	83. 1	103. 8
1963	------	------	50, 644. 5	8, 419. 3	2, 849. 0	894. 5	4, 960. 5	417. 2
1962	9. 1	------	45, 904. 9	7, 857. 2	2, 381. 3	901. 6	4, 375. 9	378. 1
1961	11. 4	------	44, 704. 8	6, 978. 3	2, 644. 0	1, 071. 0	4, 445. 8	303. 5
1960	10. 6	------	46, 781. 7	7, 751. 7	2, 357. 9	1, 039. 8	5, 085. 1	285. 7
1959	12. 4	------	42, 130. 2	7, 748. 9	2, 213. 9	1, 052. 5	4, 205. 7	253. 5
1958	11. 2	------	38, 479. 3	6, 114. 5	2, 400. 1	992. 5	4, 227. 4	320. 7
1957	14. 1	43. 0	47, 125. 4	8, 017. 9	2, 644. 8	1, 272. 2	7, 322. 8	468. 9
1956	15. 5	61. 2	49, 246. 2	9, 898. 9	2, 780. 9	1, 296. 8	5, 869. 6	384. 2
1955	16. 3	63. 7	51, 051. 3	10, 122. 8	2, 393. 1	1, 264. 0	5, 072. 3	302. 7
1954	13. 6	44. 3	37, 651. 8	6, 916. 0	1, 924. 7	937. 0	4, 768. 8	262. 4
1953	35. 8	47. 7	46, 690. 7	10, 980. 2	2, 042. 3	1, 174. 8	5, 362. 8	262. 9
1952	28. 9	62. 6	36, 747. 3	9, 772. 8	1, 974. 3	911. 5	4, 442. 9	206. 8

Source: American Iron & Steel Institute; Area Redevelopment Administration, U.S. Department of Commerce.

TABLE 9–B

Production of Iron and Steel Products, 1952 to 1963 (Thousands of tons)

	Rails	*Joint bars and tie plate bars*	*Skelp*	*Blanks, tube round or pierced billets for seamless tubing*	*Wire rods*	*Rolled forging billets*	*Blooms, billets etc., for export*
1958–1963 as percent of 1952–1957	41. 1	33. 7	69. 6	74. 2	84. 8	62. 6	42. 5
1963	531. 3	171. 4	3, 012. 1	3, 617. 6	4, 626. 7	1, 080. 3	194. 9
1962	544. 5	133. 5	3, 051. 5	3, 554. 8	4, 435. 2	969. 8	102. 0
1961	472. 2	109. 9	3, 320. 4	3, 699. 8	4, 415. 9	767. 3	122. 5
1960	710. 6	172. 5	3, 192. 9	3, 545. 6	4, 265. 3	926. 8	---------
1959	631. 0	207. 0	3, 722. 3	3, 814. 4	4, 628. 1	923. 5	1
1958	586. 5	164. 1	3, 349. 4	3, 193. 1	4, 342. 0	700. 0	1
1957	1, 308. 2	352. 6	5, 204. 4	5, 506. 7	4, 695. 6	1, 238. 2	253. 5
1956	1, 301. 4	448. 4	5, 451. 0	4, 908. 8	5, 608. 9	1, 465. 4	177. 6
1955	1, 227. 4	472. 8	5, 143. 9	4, 890. 8	6, 098. 3	1, 958. 8	242. 4
1954	1, 171. 1	362. 6	3, 880. 6	4, 516. 5	4, 686. 9	1, 103. 3	5. 9
1953	1, 981. 9	633. 8	4, 696. 1	4, 984. 0	5, 192. 7	1, 445. 5	1. 8
1952	1, 472. 1	576. 4	3, 855. 1	4, 080. 1	5, 212. 6	1, 361. 1	311. 2

Source: American Iron & Steel Institute; Area Redevelopment Administration, U.S. Department of Commerce.

TABLE 9–C

Production of Iron and Steel Products, 1952 to 1963 (Thousands of tons)

	Rolled steel car wheels	*All other*	*Total hot rolled*	*Tin and terne plate*	*Black plate*	*Cold finished bars*
1958–1963 as % of 1952–1957	69. 3	123. 6	90. 3	105. 2	100. 8	76. 3
1963	258. 2	173. 0	81, 850. 7	4, 875. 0	6, 003. 7	1, 556. 5
1962	231. 9	176. 2	75, 059. 4	5, 364. 8	6, 358. 5	1, 484. 5
1961	180. 4	175. 8	73, 411. 6	5, 610. 2	6, 752. 7	1, 307. 6
1960	239. 5	91. 5	76, 446. 5	5, 900. 9	6, 866. 0	1, 561. 9
1959	232. 4	91. 5	71, 855. 8	4, 570. 8	5, 418. 9	1, 569. 2
1958	150. 3	84. 4	65, 105. 5	5, 135. 0	6, 162. 2	1, 167. 1
1957	383. 9	91. 8	85, 886. 9	5, 463. 4	6, 495. 1	1, 496. 6
1956	337. 0	109. 3	89, 284. 3	5, 469. 4	6, 865. 9	1, 924. 1
1955	315. 6	101. 4	90, 657. 6	5, 157. 4	6, 572. 0	2, 073. 7
1954	191. 0	86. 2	68, 464. 6	4, 852. 2	5, 999. 7	1, 332. 0
1953	322. 0	172. 1	85, 943. 7	4, 841. 2	6, 043. 6	2, 374. 9
1952	316. 9	80. 4	71, 348. 5	4, 109. 3	5, 275. 3	2, 126. 6

Source: American Iron & Steel Institute; Area Redevelopment Administration, U.S. Department of Commerce.

TABLE 9-D

Production of Iron and Steel Products, 1952 to 1963 (Thousands of tons)

	Tool steel (rolled or forged)	*Steel forgings by rolling mills and steel works*	*Rails by processes*	*Pipe and tubing by process*	*Drawn wire*
1958–1963 as percent of 1952–1957	64. 4	71. 8	41. 1	75. 3	80. 7
1963	90. 8	505. 9	531. 3	7, 226. 3	3, 366. 4
1962	84. 8	506. 7	544. 5	7, 054. 1	3, 376. 2
1961	73. 9	414. 5	472. 2	7, 387. 5	3, 333. 3
1960	93. 4	433. 6	710. 6	7, 638. 3	3, 263. 1
1959	115. 9	408. 4	631. 0	8, 164. 3	3, 628. 1
1958	72. 8	351. 4	586. 5	7, 299. 0	3, 362. 4
1957	109. 2	708. 9	1, 308. 2	11, 416. 9	3, 680. 9
1956	157. 2	642. 9	1, 301. 4	10, 496. 7	4, 383. 4
1955	154. 9	547. 1	1, 227. 4	10, 038. 6	4, 786. 7
1954	105. 0	402. 6	1, 171. 1	8, 662. 3	3, 855. 8
1953	148. 5	697. 5	1, 981. 9	10, 249. 9	4, 162. 9
1952	150. 8	648. 2	1, 472. 1	8, 611. 1	4, 326. 4

Source: American Iron and Steel Institute.

Growth in Imports

In contrast to recent domestic trends in the production of steel products, growth in imports over the 1952–63 period has been sharp Table 10 shows 1958–63 total steel product imports (final column) at 252.8 percent of those for the preceding 6-year period, or an average 6-year increase of 152.8 percent over the 12-year period. The various individual product groups showed gains ranging from 27.2 percent (iron products and ferroalloys) to 259.6 percent (sheets and strip). Every major import category showed a definite uptrend in volume. However, the impact of these imports varied from categories that constituted a negligible percent of total domestic supply to those that made up nearly 18 percent of total domestic supply. The steel product groups experiencing the greatest inroads from imports were wire rods, structural shapes and piling, bars and tool steel, pipe and tubing, and wire and wire products. Individual products as distinct from product groups (Tables 11, 11–A and 12) with a particularly high degree of foreign competition were concrete reinforcement bars, black plate, barbed wire, nails, and staples; among fabricated products were pliers, scissors and shears.

The effect of some of these imports has been highlighted by price weaknesses, which developed in reinforcing bars and pipe during 1961 and 1962, and which had occurred earlier in wire-mill products.

Sources of Imports

ECSC nations supply close to 40 percent of imports, with Belgium and Luxembourg the leaders, especially in wire, rods and bars. Japan is second, supplying about 30 percent of total imports (particularly wire, rods, reinforcement bars, and pipe); Canada and the United

TABLE 10

Imports of Steel and Steel Products, 1952 to 1963

(Thousands of tons)

Steel mill products	*Ingots, blooms, billets, slabs*	*Wire rods*	*Structural shapes and piling*	*Plates*	*Rails and accessories*
1958–1963 as percent of 1952–1957	206. 5	929. 4	136. 2	279. 5	217. 7
1963	264. 7	800. 8	558. 4	274. 9	11. 7
1962	174. 4	644. 6	374. 2	150. 4	12. 0
1961	179. 5	451. 2	293. 2	37. 1	22. 6
1960	68. 5	408. 2	317. 4	211. 8	10. 4
1959	91. 9	448. 0	506. 8	291. 4	9. 6
1958	18. 1	181. 3	150. 9	20. 1	4. 9
1957	8. 1	54. 4	268. 5	22. 2	5. 4
1956	28. 2	64. 1	348. 9	50. 6	8. 4
1955	146. 1	47. 8	110. 1	1. 7	7. 4
1954	8. 8	40. 0	124. 6	1. 7	3. 9
1953	133. 7	65. 4	451. 1	133. 0	3. 3
1952	61. 1	44. 0	313. 2	143. 5	4. 3
Recent imports as percent (approximate) of new supply (domestic output plus imports)	0	12–15	6–10	2–4	1–3

Source: American Iron & Steel Institute; Area Redevelopment Administration, U.S. Department of Commerce.

TABLE 10–A

Imports of Steel and Steel Products, 1952 to 1963
(Thousands of tons)

Steel mill products	*Bars and tool steel*	*Pipe and tubing*	*Wire and wire products*	*Tin mill products*
1958–1963 as percent of 1952–1957	346. 7	323. 2	326. 6	-------
1963	1, 079. 7	778. 9	762. 0	94. 4
1962	994. 8	654. 8	655. 1	56. 3
1961	906. 3	521. 3	561. 8	19. 1
1960	840. 5	480. 0	547. 3	39. 3
1959	1, 339. 1	553. 1	703. 5	67. 1
1958	649. 3	200. 0	432. 2	-------
1957	263. 1	190. 8	301. 1	-------
1956	396. 5	140. 4	247. 4	1. 1
1955	283. 0	77. 1	245. 3	-------
1954	289. 3	66. 3	196. 4	-------
1953	207. 3	237. 8	76. 5	-------
1952	236. 7	274. 1	54. 4	-------
Recent imports as percent (approximate) of new supply (domestic output plus imports)	*9–11	6–8	15–16	0–1

*The percentage for reinforcing bars, alone, has ranged between 15 percent and 30 percent.

Source: American Iron & Steel Institute; Area Redevelopment Administration, U.S. Department of Commerce.

TABLE 10–B

Imports of Steel and Steel Products, 1952 to 1963

(Thousands of tons)

Steel mill products	*Sheets and strip*	*Total steel mill products*	*Other steel products*	*Total steel products*	*Iron products and ferroalloys*	*Grand total*
1958–1963 as percent of 1952–1957	359. 6	311. 1	195. 1	302. 0	127. 2	252. 8
1963	826. 8	5, 452. 3	212. 4	5, 644. 7	862. 6	6, 527. 4
1962	383. 5	4, 100. 0	205. 4	4, 305. 5	687. 7	4, 993. 2
1961	171. 0	3, 163. 2	158. 2	3, 321. 4	604. 9	3, 926. 3
1960	435. 6	3, 358. 8	219. 3	3, 578. 0	509. 6	4, 087. 6
1959	386. 0	4, 396. 4	232. 0	4, 628. 3	895. 2	5, 523. 6
1958	50. 0	1, 707. 1	124. 0	1, 831. 1	305. 1	2, 136. 2
1957	41. 2	1, 154. 8	149. 2	1, 304. 1	549. 4	1, 853. 5
1956	55. 3	1, 340. 8	140. 1	1, 480. 9	519. 0	1, 999. 9
1955	54. 7	973. 2	102. 0	1, 075. 2	394. 3	1, 469. 5
1954	40. 0	770. 8	106. 6	877. 4	377. 1	1, 254. 5
1953	394. 5	1, 703. 0	38. 9	1, 741. 9	740. 1	2, 482. 0
1952	40. 8	1, 185. 7	53. 2	1, 238. 9	457. 6	1, 696. 5
Recent imports as percent (approximate) of new supply (domestic output plus imports)	0–2	5–6	-----	5–6	0–1	-------

Source: U.S. Bureau of the Census; American Iron and Steel Institute.

Kingdom are the only other major suppliers, accounting for around 10 percent and 5 percent, respectively.

Imports have made their biggest market penetration on the Gulf and West Coasts. In the Gulf States, European pipe and reinforcement bars are most important. Japan accounts for over half of imports into California and other Pacific Coast States, with the major products being pipe, wire rods, and reinforcement bars. Rail transportation costs make the West Coast a prime target for imports, and practically all of tinplate imports (from the United Kingdom and Japan) go into that area.

Product Group Operating Rates

According to available data (Tables 11 and 11–A), which are severely limited, the only product whose production is near a reasonable rate (80.7 percent in 1960) of capacity, and which encounters sizable foreign competition, is concrete reinforcement bars.[12]

Average plant-operating rates (production as a percent of capacity) for steel products vary from small percentages (which are misleading in some cases because of the possibility or existence of substitution—that is, other products can and, in some cases, are produced with the same equipment) up to slightly over 80 percent (steel bars again, and long terne sheet). Production of cold-rolled and galvanized sheets, tin and terne plate, hot-rolled sheet-coils or cut lengths, and coils for cold-reduced black plate and tin plate averaged between 70 and 80 percent of plant capacity in 1960.[13] The remaining steel-product facilities, some 80 percent of the Total, operate at less than 70 percent of capacity. (See Tables 11 and 11–A.)

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[12] The possibility exists that there are other products having these characteristics, but a detailed check, which may be difficult if not impossible, will be delayed until ARA needs demand it.

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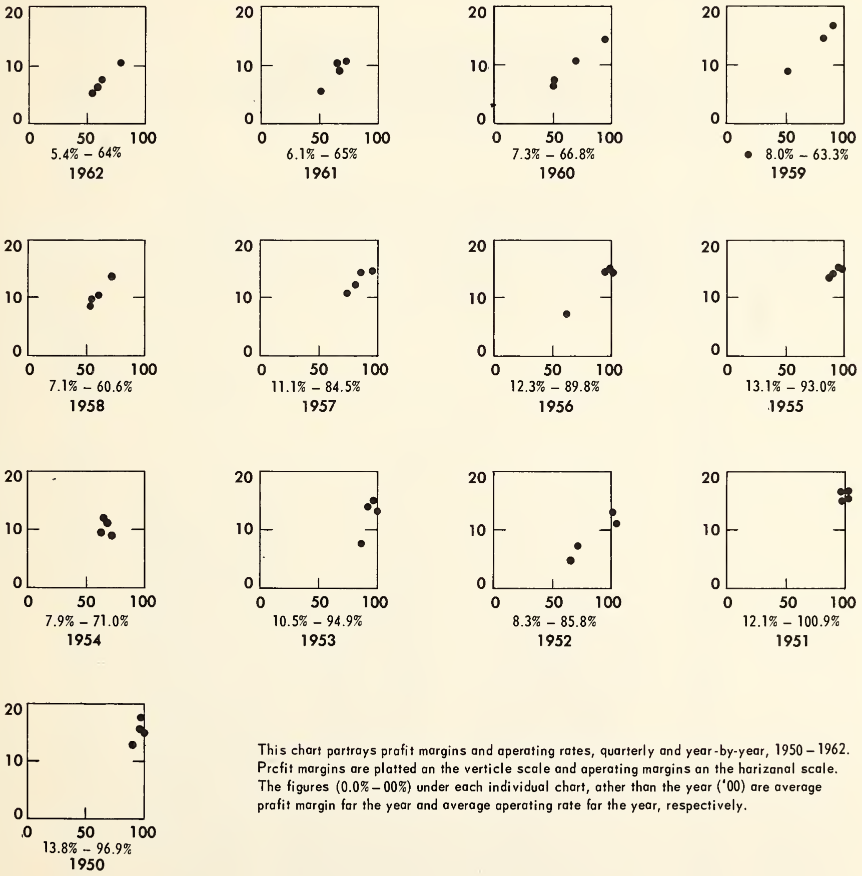
[13] 1960 is the last year for which the American Iron and Steel Institute published capacity figures.

Chart G

Relationship of Profit Margins to Operating Rates, Quarterly Data for Years 1950-1963



5.4% – 64%
1962

6.1% – 65%
1961

7.3% – 66.8%
1960

● 8.0% – 63.3%
1959

7.1% – 60.6%
1958

11.1% – 84.5%
1957

12.3% – 89.8%
1956

13.1% – 93.0%
1955

7.9% – 71.0%
1954

10.5% – 94.9%
1953

8.3% – 85.8%
1952

12.1% – 100.9%
1951

13.8% – 96.9%
1950

This chart portrays profit margins and operating rates, quarterly and year-by-year, 1950 – 1962. Prcfit margins are plotted on the verticle scale and operating margins on the horizanal scale. The figures (0.0% – 00%) under each individual chart, other than the year ('00) are average profit margin for the year and average operating rate for the year, respectively.

TABLE 11

Iron Products: Capacity, Imports, and Production with Operating Rates and Imports as a Percent of Supply, 1960

Product	*Capacity*	*Imports (net tons)*	*Production*	*Operating rate*	*Imports as percent of supply*
Bar iron, iron slabs and blooms, etc		73			
Cast iron soil pipe and fittings	N.A.	14, 473	[1] 782, 051	N.A.	1. 8
Cast iron pressure pipe and fittings	N.A.	3, 916	[1] 1, 355, 546	N.A.	. 3
Malleable cast iron pipe fittings	N.A.	7, 531	N.A.	N.A.	N.A.
Castings and forgings	N.A.	15, 288	N.A.	N.A.	N.A.
Pig iron	96, 520, 630	330, 847	[2] 67, 320, 129	697	. 6
Sponge iron		4, 814	N.A.		
Ferroalloys	[3] N.A.	132, 838	2, 085, 736	N.A.	6. 0
Ferromanganese (Manganese content)	N.A.	92, 599	679, 633	N.A.	N.A.
Spiegeleisen (Manganese content)	N.A.			N.A.	N.A.
Ferrosilicon (Silicon content)	N.A.	4, 974	N.A.	N.A.	N.A.
Ferrochrome (Chrome content)	N.A.	34, 405	246, 292	N.A.	12. 2
Other ferroalloys	N.A.	860	N.A.	N.A.	N.A.
Total Iron Products and Ferroalloys		509, 780	N.A.	N.A.	N.A.

---

[1] Represents shipments (short tons); production figures not available.
[2] Includes small amount of ferroalloys.
[3] Capacity data on ferroalloys produced in electric furnaces is not available.

Source: American Iron and Steel Institute.

TABLE 11–A

Selected Steel Products: Capacity, Imports, and Production with Operating Rates and Imports as a Percent of Supply, 1960

Product	*Capacity*	*Imports*	*Production*	*Operating rate (%)*	*Imports as a percent of supply* [1]
Rails	1, 505, 540	8, 707	710, 604	47. 2	1. 2
Standard (over 60 pounds)	1, 395, 600	N.A.	N.A.	---	---
All other	109, 940	N.A.	N.A.	---	---
Long joint or splice bars and tie plate bars	532, 580	N.A.	172, 522	32. 4	N.A.
Structural shapes, heavy	8, 218, 940	311, 673	5, 085, 115	61. 9	5. 7
Steel piling, rolled	434, 600	N.A.	285, 665	65. 7	N.A.
Plates	10, 986, 740	210, 772	7, 449, 484	67. 8	2. 7
Sheared	9, 702, 980	N.A.	6, 600, 666	68. 0	N.A.
Universal	1, 283, 760	N.A.	848, 818	66. 1	N.A.
Hot rolled sheets (coils or cut lengths)	39, 512, 570	208, 525	29, 596, 633	74. 9	. 6
Coils for cold reduced Black plate and tin plate	10, 827, 360	N.A.	7, 957, 496	73. 4	N.A.
Hot rolled strip	2, 656, 110	56, 970	1, 767, 478	66. 5	3. 1
Bars	18, 349, 130	831, 507	11, 149, 341	60. 7	6. 9
Light shapes	1, 273, 680	N.A.	1, 039, 800	81. 6	N.A.
Concrete, reinforcement	2, 919, 630	515, 541	2, 357, 888	80. 7	17. 9
All other	14, 155, 820	N.A.	7, 751, 653	54. 7	N.A.
Wire rods	7, 340, 480	408, 216	4, 265, 289	58. 1	8. 7
Skelp	6, 070, 920	721	3, 192, 851	52. 5	0. 0
Blanks, tube rounds or pierced billets for seamless tubes	5, 836, 180	N.A.	3, 545, 598	60. 7	N.A.
Wheels and axles (rolled)	483, 040	1, 691	239, 532	49. 5	. 7
Cold finished bars	4, 175, 600	8, 975	1, 561, 881	37. 4	. 5
Sheets	26, 367, 340	---	18, 747, 995	71. 1	N.A.
Cold rolled sheets	22, 007, 670	70, 423	16, 479, 075	74. 8	. 3
Galvanized	4, 153, 870	94, 533	3, 101, 944	74. 6	3. 0
Long terne	206, 100	N.A.	166, 976	81. 0	N.A.
Strip:					
Cold rolled	3, 627, 260	4, 322	1, 718, 296	47. 3	. 2
Galvanized	244, 370	N.A.	N.A.	N.A.	N.A.
Black plate	N.A.	19, 536	548, 080	N.A.	34. 4
Tin and terne plate	8, 209, 190	19, 728	5, 900, 847	71. 7	. 3
Splice bars and other rail joints	340, 800	N.A.	43, 939	12. 8	N.A.

Product	*Capacity*	*Imports*	*Production*	*Operating rate (%)*	*Imports as a percent of supply* [1]
Tie plates	590, 370	N.A.	123, 675	20. 9	N.A.
Track spikes	249, 800	N.A.	47, 558	19. 0	N.A.
Wire	9, 259, 000	285, 750	------	N.A.	N.A.
Plain	7, 256, 320	180, 874	3, 263, 110	44. 9	5. 5
Barbed	388, 790	52, 973	48, 613	12. 5	52. 1
Galvanized	1, 613, 890	51, 903	N.A.	N.A.	N.A.
Nails and staples	1, 155, 960	239, 522	368, 914	31. 9	39. 4
Wire nails	------	231, 759	347, 051	------	40. 0
Wire staples	------	7, 763	8, 465	------	26. 2
Cut nails	------		13, 398	------	
Woven wire fence	835, 570	N.A.	115, 033	13. 7	N.A.
Wire netting:					
Wire reinforcing fabric	1, 115, 760	N.A.	N.A.	N.A.	N.A.
Bale ties	123, 050	1, 033	14, 820	12. 0	6. 5
Pipe and tubing	16, 502, 960	------	7, 638, 319	46. 2	5. 9
Buttweld	3, 811, 100	480, 090	1, 916, 493	50. 2	------
Lapweld	90, 000		21, 964	24. 4	------
Electricweld	7, 066, 940		2, 811, 207	39. 7	------
Seamless	5, 193, 120		2, 787, 249	53. 6	------
Spiralweld	307, 000		101, 406	29. 6	------
Gasweld	34, 800			------	------
Ingots	[1] 148, 570, 970	[2] 67, 872	[3] 99, 064, 219	66. 7	0. 0

[1] Includes capacity for small quantity of steel castings.
[2] Includes ingots and an unknown quantity of blooms, slabs, and billets.
[3] Represents ingots less a small quantity of steel for castings.

Source: American Iron and Steel Institute.

TABLE 12

Imports and Exports of Primary and Fabricated Iron and Steel Products, 1958

Products	*Percent, exports to manufacturers' shipments*		*Percent, imports to new supply (output plus imports)*	
	Quantity	*Value*	*Quantity*	*Value*
PRIMARY METAL PRODUCTS:				
Blast furnace and steel mill products	–	4	–	1
Coke and screening	2	2	1	0
Pig iron	1	1	2	2
Steel ingot and semifinished shapes	–	1	–	1
Steel sheet strip, plate, bar-hot rolled	–	4	–	1
Carbon sheets and plates	3	4	0	0
Alloy sheets and plates	2	2	0	0
Carbon strip	1	2	4	4
Alloy strip	4	4	1	1
Carbon bars	2	2	3	2
Alloy bars	–	1	0	0
Concrete reinforcing bars	1	1	17	10
Tin-mill products	8	7	0	0
Other carbon and alloy steel	3	5	–	–
Structural shapes and piling, carbon steel	9	7	3	2
Structural shapes and piling, alloy	3	7	0	0
Steel wire	0	2	0	3
Steel pipe and tubes	–	9	–	2
Cold rolled sheet and strip, plate, bar, carbon	3	3	0	0
Cold rolled sheet and strip, plate, bar, alloy	3	3	0	0
Other steel mill products	–	24	–	0
Ferroalloys	3	1	5	5
Steel nails and spikes	1	3	24	16
Grey iron castings	1	1	0	0
Cast iron pressure pipe and fittings	1	2	0	0
Cast iron soil pipe and fittings	1	2	1	1
Other grey iron castings	1	1	0	0
Malleable iron castings	0	0	1	1
Steel castings	2	1	0	0
Steel forgings	–	2	0	0
FABRICATED METAL PRODUCTS:				
Metal cans	1	1	–	0
Cutlery	–	3	–	5
Cutlery, scissors, shears, trimmers, and snips	–	3	–	9
Folding blade knives	–	–	–	7
Scissors and shears	–	6	–	12
Razorblades and razors, except electric	–	2	–	0
Hand and edge tools, except saws	–	10	–	3
Mechanics' hand service tools	–	–	–	3
Pliers	8	8	31	9
Hand and edge tools, n.e.c	–	–	–	2
Handsaws, sawblades, and accessories	–	8	–	2
Hardware, n.e.c.	–	3	–	–
Metal plumbing fixtures	–	4	–	0
Plumbing fixtures, fittings, and trim	–	3	–	–
Heating equipment, except electric	–	4	–	–
Fabricated structural iron and steel	–	3	–	1

Products	Percent, exports to manufacturers' shipments		Percent, imports to new supply (output plus imports)	
	Quantity	Value	Quantity	Value
Metal door and window sash and frames	–	1	–	–
Iron and steel window sash and frames	–	–	–	1
Fabricated platework	–	7	–	–
Sheet metal products	–	2	–	–
Architectural and miscellaneous metalwork	–	1	–	–
Bolts, nuts, screw machine products	–	1	–	1
Vitreous enameled products	–	1	–	–
Cooking and kitchen utensils	–	2	–	5
Stamped and spun cooking and kitchen utensils, n.e.c	–	5	–	2
Crowns	5	5	–	–
Noninsulated ferrous wire rope, cable, and strand	–	5	–	4
Wire cloth and other woven wire products	------	2	------	2
Fencing and fence gates	------	----	------	3
Other fabricated wire products (except springs)	------	----	------	4
Barbed and twisted wire	------	2	51	40
Wire bale ties	------	----	30	23
Wire chain	------	----	2	1
Metal shipping barrels, drums, kegs, pails	------	3	------	–
Safes and vaults	------	8	------	-----
Leaf springs, automotive	3	4	------	-----
Valves and pipe fitting	------	9	------	-----
Metal valves	------	–	------	0
Metal foil and leaf	------	----	------	0

Note: These figures are based on 1958 data; the import percentages have risen sharply in many instances since then. The figure zero (0) indicates amount not exceeding 0.5 percent. A short dash (–) indicates in absence of data needed to compute the percentage.

Source: U.S. Bureau of Census, U.S. Commodity Exports and Imports as Related to Output, 1958.

ARA PROJECTS AND POLICIES

The most numerous steel product category represented in ARA projects is concrete reinforcing bars. It is conceivable as a theoretical proposition that these projects, if strategically located around the perimeter of the United States, could take their markets largely by displacing imports of concrete reinforcing bars. In addition to geographical placement, the various projects would have to produce a product mix which duplicated, by type and size, the items being imported. The likelihood that all seven projects could do this is extremely limited. Each project therefore requires individual examination to determine its regional import displacement potential and probable impact on the domestic industry.

The following discussion plus Tables 13 and 14 has been prepared as background information for individual investigations of reinforcement bar projects:

Table 13 shows the magnitude and growth of imports of rebars (reinforcement bars), and the percentage relationship of these imports to total domestic supply (domestic shipments plus imports) for the years 1948, 1953–62. Domestic shipments grew 55 percent from 1948 to 1962, while total domestic supply rose 84 percent; the difference between these two percentages is accounted for by the nearly eightfold increase in imports during the period. As shown in the final column, imported rebars accounted for 4.9 percent of total U.S. supply in 1948 and rose to 20.2 percent by 1962.

The growth in the total rebar market, plus growth and magnitude of rebar imports has drawn the attention of potential manufacturers, seven of whom have applied for ARA financial assistance (two of these applications have been approved). The economic rationale behind these ARA applications has been based in part on the projects' potential for gaining a market by displacing imports instead of competing directly with the beleagured domestic industry for the remaining domestic market. A project which takes its market from imported products would be creating net new domestic jobs, whereas one which crowds into the existing market for domestically produced rebars would merely transfer job opportunities from one area (where many steelworkers are already unemployed) to another.

Further assumptions are that these projects can, by operating electric steel-making furnaces using steel scrap as a raw material, locate their facilities in positions where they can ship their products competitively with imports. The electric furnace appears to permit both variable geographic positioning and relatively low-cost production (providing scrap supplies and electricity are plentiful and cheap).

Table 14 shows domestic rebar production capacity and imports by State in the first two columns. The third column suggests, on a purely hypothetical basis, the barest possibility of new locations for small rebar manufacturing facilities. The suggested new plant locations are for illustrative purposes only, and take into consideration only two factors: the apparent domestic production, or lack of such; and the relative size and total amount of imports during 1960. The nature (detailed product description) of the imports and of nearby domestic production would have to be accurately determined, and the existence of actual markets, the cost and availability of steel scrap and electricity, plant site possibilities, transportation costs, are all items that would require investigation before a project could be advanced as economically feasible on the one hand, and not totally competitive with the existing domestic industry on the other.

TABLE 13

Reinforcing Bars

Shipments by Domestic Steel Producers, Imports (Thousands of net tons)

Year	*Domestic*	*Imports*	*Total supply*	*Imports as percent of total supply*
1962	2, 389	607	2, 996	20. 2
1961	2, 442	583	3, 025	19. 2
1960	2, 214	516	2, 730	18. 9
1959	2, 173	852	3, 025	28. 2
1958	2, 035	473	2, 508	18. 9
1957	2, 300	160	2, 460	6. 5
1956	2, 519	173	2, 692	6. 4
1955	2, 165	159	2, 324	6. 8
1954	1, 751	164	1, 915	8. 5
1953	1, 849	108	1, 957	5. 5
1948	1, 542	79	1, 621	4. 9

Sources: American Iron and Steel Institute and U.S. Department of Commerce.

TABLE 14

Concrete Reinforcement Bars: Capacity for Production, Imports, Hypothetical New Plant Location

State or entry point	*Production capacity (1,000 tons)*	*Imports (entry point) (1,000 tons)*	*Hypothetical new plant location* [1]
Massachusetts	15	20	Plant.
New York	145	70 2 (Buffalo)	Plant.
Pennsylvania	399	22 (Philadelphia)	
Ohio	110	15	
Indiana	182		
Michigan	------	9	
Illinois	300	8 (Chicago)	
Wisconsin	------	4	
Minnesota	------	7 (Duluth-Superior)	
Maryland	240	16	
West Virginia	20		
Virginia	4	3	
North Carolina	------	3	
South Carolina	------	5	
Georgia	60	1	
Florida	40	65	Plant.
Alabama	201	15 (Mobile)	
Mississippi	30		
Tennessee	23		
Missouri	118		
Louisiana	------	34 (New Orleans)	Plant.
Oklahoma	134		
Texas	99	121 (Galveston)	Plant.
California	563	57 (Los Angeles) 33 (San Francisco) 2 (San Diego)	
Colorado	70		
Oregon	75	5	
Washington	91	9	
Puerto Rico	------	64	Plant.

[1] See text.

Source: American Iron and Steel Institute; Bureau of the Census, Area Redevelopment Administration, U.S. Department of Commerce.

IMPLICATIONS FOR ARA POLICY ON IRON AND STEEL PROJECTS

In summary, the steel industry is operating at below normal or traditional capacity levels; below levels that could be achieved and still allow a flexible response to consumer demand; below levels that yield profits at parity with all manufacturing industries and with the steel industry historically; and far below levels that would utilize all efficient facilities on a full year-around basis. With a few possible exceptions, the foregoing is true nationally and regionally for both basic steel and steel products.

Recent levels (1960–63) of steel shipments, production, employment, and profits, and of total domestic steel consumption and steel exports are all well below their post World War II peaks. Entirely aside from measures of the industry's capacity to produce, these facts (which represent all that are available for most industries) are adequate to establish the beleaguered state of the industry.

The steel industry's existing facilities can be expanded at present sites through the use of richer ore burdens in blast furnaces and the use of oxygen conversion in open hearths, to the extent that very little construction of entirely new capacity will be required to meet prospective demand over the next several years.

Shifts in geographic location of the steel industry have been gradual in the past and may assume an even slower pace in the future because of the ease with which facilities at existing sites can be expanded.

The newer technology that is being accepted by the industry today is such that it will not force drastic abandonment of existing facilities that are sound in condition and efficient in size.

In view of the foregoing, it is suggested that:

- ARA delay projects that would compete mainly with existing basic iron and steel capacity until the industry has manifested a fairly consistent and measurable degree of recovery in shipments and profits, and has lifted its operating rate to the vicinity of 80 percent of estimated capacity (providing that the situation with regard to plant obsolescence has not changed significantly from that outlined earlier in this report);
- ARA projects offering the promise of import displacement (either in materials or products) be considered only after the applicant has successfully borne a heavy burden of proof in demonstrating that the project's cost of production (based on average wage levels for the industry) and geographic position would insure its successful operation with a minimum of competition with the domestic industry;
- Projects having the additional merit of demonstrating the cost-reduction value of new iron- or steel-making processes, processes that

could eventually lead to substantial improvement in the efficiency of the domestic industry vis-a-vis foreign producers, should deserve special consideration in view of possible favorable effects on the U.S. balance of trade and the national unemployment rate.

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